

THE AMERICAN JOURNAL OF PHARMACY.

JUNE, 1881.

SANGUINARIA CANADENSIS.

BY FRANK L. SLOCUM, PH.G.

From an Inaugural Essay.

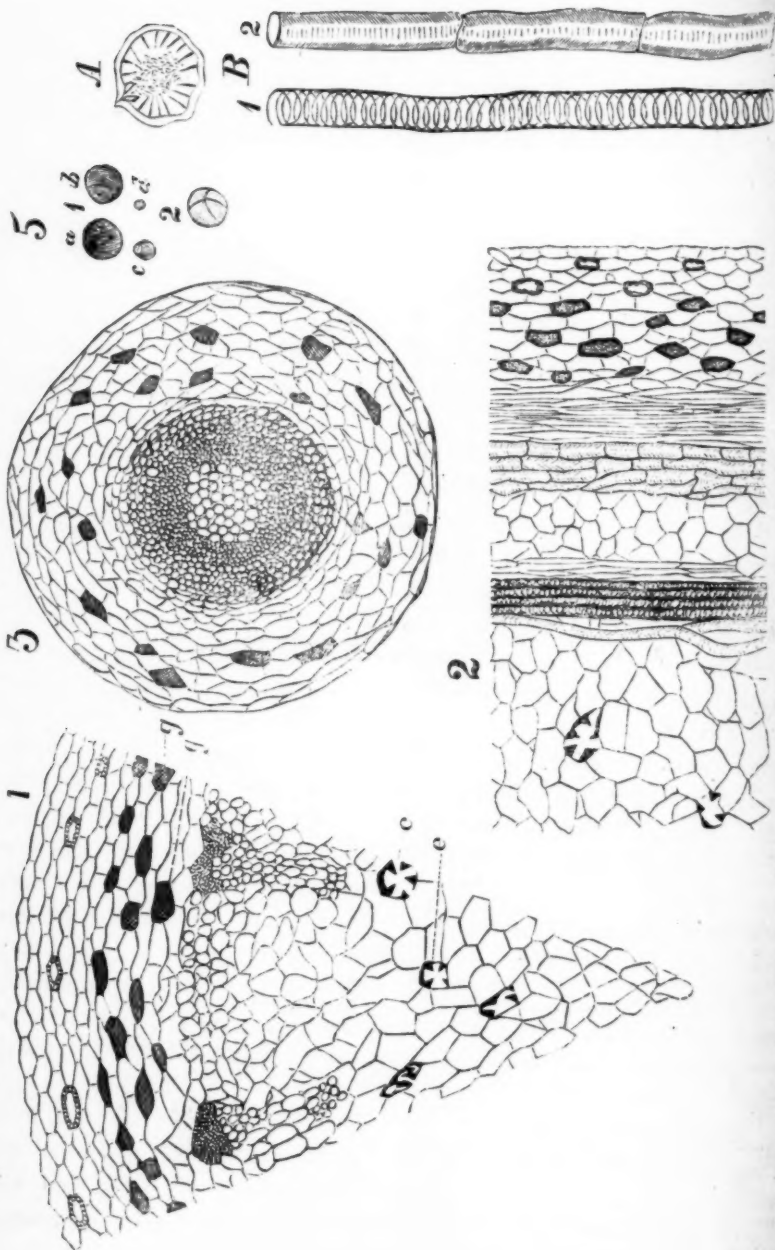
The microscopical structure of the rhizome of *Sanguinaria* has not yet, to my knowledge, been figured, and is only briefly mentioned by De Bary in his "Vergleichende Anatomie," p. 209, 450. Hence a microscopical examination has been made.

Fig. 1 represents a cross-section of the rhizome, showing the general arrangements of the fibrovascular bundles which are situated in a double circle three-fourths of the distance from the center to the exterior.

Outside of the xyleme the parenchyme is rather compressed; the 8 or 10 external rows of cells are generally quite devoid of starch, and contain a few resin cells, *gg*. The fibrovascular bundles in the outer circle are composed of about 12 vessels each, shortly jointed, and their course is exceedingly difficult to trace. They are all of one class, namely, pitted vessels; the sieve tubes are few, and nearly all situated in the outer portion of the fibrovascular bundles. The fibrovascular bundles in the inner circle are smaller, the vessels are longer and their course is quite easily traced; the sieve tubes are in the same position as in the outer row of bundles.

Inside of the circle of fibrovascular bundles, and between them, is loose parenchyme, filled with starch; the large cells, *ee*, containing the red juice, are shown with the juice dried and adhering to the cell walls.

According to De Bary, (*loc. cit.*), laticiferous ducts are absent in the *Sanguinaria*, having in their place large thin-walled cells, filled with red juice. In only one specimen out of nearly 50 examined were found spiral ducts in the rootlets and inner circle of the fibrovascular bundles.

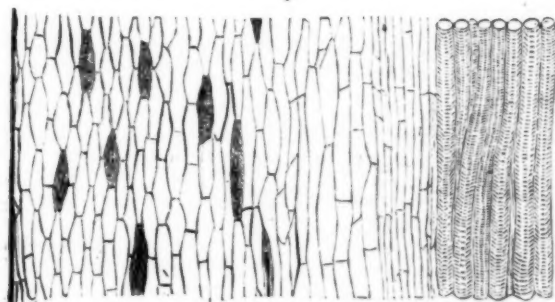


SANGUINARIA CANADENSIS.—A Transverse section of rhizome, natural size. B Ducts: 1. spiral; 2. dotted.
1. Rhizome, transverse section, magnified. 2. Rhizome, longitudinal section, magnified. 3. Rootlet, transverse section, magnified. 4. Starch granules, highly magnified.

Fig. 2 represents a longitudinal section of the rhizome, the structure of which may be understood from the above explanation of the cross-section.

Fig. 3 represents a transverse section of a rootlet; the vessels are seen to be closely aggregated in the center, surrounded by sieve tubes, which, as they become more removed from the vessels, are of somewhat, but slightly, increased diameter. Outside of the nucleus sheath the structure consists of parenchyme, flattened and elongated, and containing resin cells.

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SANGUINARIA CANADENSIS.—4. Rootlet, longitudinal section, magnified.

Fig. 4 shows a longitudinal section of a rootlet, which is understood by the above description of the transverse section.

Fig. 5 shows the starch granules highly magnified, probably two-thirds of the granules being of the size of 1-ab, while the remainder are of the size 1-cd.

The granule 1-a measures 0.022 mm., while the smallest granules measured 0.0032 mm. 2 shows the appearance of a granule under polarized light.

A represents a transverse section of rhizome, of natural size.

B 1 and 2 represent two ducts much magnified, 1 being a spiral duct from a rootlet, 2, a dotted duct from the rhizome.

The external layer of cells in both rhizome and rootlet do not differ materially from the others, being only slightly flattened.

Chemical Examination.—Four pounds (avd.) of carefully selected rhizome were reduced to powder No. 50 and exhausted with stronger alcohol; the alcohol was removed by distillation, leaving a soft dark red extract, weighing $\frac{3}{4}$ pound (avd.). The extract was then mixed

with half a gallon of acidulated water (water 48 parts, acetic acid 1 part), which precipitated the resin, leaving a blood-red solution; the resin was removed by filtration, and thoroughly washed with distilled water, in which it is nearly insoluble, dried and weighed; the yield was 985 grains of resin, (a); the filtrate was marked (b).

Examination of Resin (a).—The resin is of a dull pale red color, slightly sternutatory, has an acrid taste, and is of waxy consistence. An examination was made by the following scheme to ascertain its nature:

The resin was dissolved in boiling alcohol and the solution cooled, when a precipitate was formed; separated by a filter.

Filtrate.

Treated with alcoholic solution of acetate of lead, which produced a slight brown precipitate; separated solution from precipitate by filtering.

Precipitate.

<i>Filtrate</i>	<i>Precipitate.</i>	
Treated with ammoniated alcohol, gave a light brown precipitate, which was separated by filtration.	Suspended in alcohol, decomposed by H_2S & filtered	Is not absolutely insoluble in cold alcohol.

<i>Filtrate</i>	<i>Precipitate</i>	<i>Filtrate.</i>	<i>Precipitate.</i>
Treated with H_2S and filtered from the lead sulphide.	Suspended in alcohol, and decomposed by H_2S ; filtered.	Yellowish brown; evaporated to dryness gave a very small amount of a brown-red resin; sparingly soluble in ether	Black PbS, containing very little coloring matter.
<i>Filtrate.</i>	<i>Precipitate.</i>	<i>Filtrate.</i>	<i>Precipitate.</i>
Evaporated nearly to dryness, gave a red resin, dissolving in cold alcohol, and having the same properties as the crude resin.	Black lead sulphide; some little coloring matter; is precipitated with it.	A light straw-colored liquid; evaporated to dryness; minute residue.	Black PbS, containing little coloring matter.

By treatment with hot alcohol and cooling, about one-tenth of the resin is precipitated as a dull brown pulverulent substance (x), slightly

inclined toward a grey-brown color. The resin (y) that is soluble in cold alcohol, is of a bright red color, extract-like consistence, has a slight taste, and colors the saliva. Their behavior to solvents, etc., was found to be as follows:

	<i>Ether.</i>	<i>Chloroform.</i>	<i>Water.</i>	<i>Carbon Disulphide.</i>	<i>Benzol.</i>
Resin (x)	Spar. soluble, hot or cold.	Spar. soluble, hot or cold.	Sufficient to color only, hot or cold.	Spar. soluble, hot or cold.	Spar. sol. hot; less sol. cold.
Resin (y)	Very spar. sol. hot or cold.	Soluble, hot or cold.	Scarcely colors, hot or cold.	Soluble hot, spar. soluble cold.	Soluble hot, spar. soluble cold.
	<i>Gasolin.</i>	<i>Caustic Potassa Sol.</i>	<i>Ammonia.</i>	<i>Hydrochloric Acid.</i>	<i>Incineration.</i>
Resin (x)	Spar. soluble, hot or cold.	Spar. sol. hot; less sol. cold.	Very spar. sol. hot or cold.	Soluble hot, spar. soluble cold.	No ash.
Resin (y)	Insoluble, hot or cold.	Sufficient to color, hot or cold.	Spar. sol. hot, insol. cold.	Soluble hot, spar. soluble cold.	Ash.

The resin (a) was examined for protocathechuic acid as follows: Equal parts of the resin and solid caustic potassa were heated together in a silver dish until completely fused. The dark colored fused mass thus obtained was dissolved in water, the aqueous solution rendered slightly acid by sulphuric acid, and filtered; the yellowish-colored filtrate was then agitated with ether until it ceased to take up any more soluble matter; the ether was then separated and evaporated spontaneously, furnishing a small amount of crystals, which gave with ferric chloride a bright emerald-green color, and on the subsequent addition of a weak solution of potassium hydrate a bright crimson-red color was produced, making it quite conclusive that protocathechuic acid was formed by the above treatment.

Resin (x) gave the same indications for protocathechuic acid when similarly treated.

Examination of Resinous Precipitates in Tincture, etc.—The precipitates formed in the liquid preparations of *Sanguinaria* on standing were also examined to ascertain whether *sanguinarina* was carried down with the resinous matter. Messrs. Bullock & Crenshaw, and Wm. R. Warner & Co., very kindly furnished me with sufficient quantities of the precipitate from the tincture and fluid extract, which were examined as follows: The drained precipitate was thoroughly washed with a mixture of alcohol 3 parts, water 1 part, and then boiled with acidulated water (water 15 parts, acetic acid 1 part), filtered, thus separat-

ing the resin and giving a dark red filtrate. The filtrate when rendered alkaline with ammonia gave a purplish precipitate; the precipitate was washed and dissolved in ether; hydrochloric acid gas was then passed into the ethereal solution till no further precipitation occurred. A dense bright red precipitate of hydrochlorate of sanguinarina was produced, and a comparatively large quantity for the amount of precipitates employed from both the tincture and fluid extract. Hence the precipitates in liquid preparations of *Sanguinaria* contain notable quantities of the alkaloid sanguinarina. None of the solvents used or tried would prevent this gradual precipitation; alcohol, however, proves to be far the best solvent, and not only holds the sanguinarina and resin in solution, but it extracts the resin more completely from the drug.

Properties of the Resin.—In doses of from two to four grains it is a nauseant, reducing the pulse and producing uneasiness in the stomach. In the "Proceedings of the American Pharmaceutical Association" for 1863, page 214, the late Prof. R. P. Thomas gives an exhaustive article on the active principles of *Sanguinaria* and their therapeutical value. In speaking of the resin he says: "The alkaloid sanguinarina is certainly the most valuable principle existing in bloodroot, but I am persuaded it is not the sole agent, as some trials made with the impure resin show that the latter also possesses nauseant and emetic properties." The examination made on the resin tends to corroborate this statement.

Examination of Filtrate (b).—To four fluidounces of the filtrate solution of acetate of lead was added, which gave a precipitate of a reddish-purple color.

<i>Precipitate.</i>	<i>Filtrate.</i>						
Suspended in water, and decomposed by H_2S , filtered, gave a dark red solution; evaporated to extract consistence, was found to consist of a gummy red coloring matter, <i>uncrystallizable</i> .	Treated with subacetate of lead; dense brown precipitate, filtered.						
<i>Inert.</i>	<table> <tr> <th><i>Precipitate.</i></th><th><i>Filtrate.</i></th></tr> <tr> <td>Suspended in water, decomposed by H_2S and filtered; brown-red solution; evaporated, left gummy extract; proved to be coloring matter.</td><td>Light red color; containing the alkaloids, etc.</td></tr> <tr> <td><i>Inert.</i></td><td></td></tr> </table>	<i>Precipitate.</i>	<i>Filtrate.</i>	Suspended in water, decomposed by H_2S and filtered; brown-red solution; evaporated, left gummy extract; proved to be coloring matter.	Light red color; containing the alkaloids, etc.	<i>Inert.</i>	
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<i>Inert.</i>							

There seem to be two coloring principles besides the resin and sanguinarina; the one precipitated by normal acetate of lead, the other by basic acetate of lead.

The whole of the filtrate *b* was then rendered alkaline with ammo-

nia, and the precipitated sanguinarina separated by filtration. The red-brown filtrate was evaporated to an extract and washed with stronger alcohol until this would take up no more (large doses of the residue left after this washing were taken, but proved to be inert). The alcoholic solution was of a dark red color, and contained much glucose, as proven by Trommer's test, the behavior to alcohol and ether and by its sweet taste. The alcohol was evaporated, leaving a sweetish brown-red extract, which was dissolved in water rendered alkaline with potassa, and agitated with ether; the ethereal solution was allowed to evaporate, when it deposited prismatic needle-shaped crystals, colorless, of a very slightly bitter taste, possessing an alkaline reaction, and forming with acids colorless solutions and producing precipitates with solutions of mercurio-potassic iodide and iodine in iodide of potassium. This colorless alkaloid exists in a very minute quantity in the rhizome. With sulphuric acid it gives a beautiful dark purple color, which is not permanent, and changes to a yellowish color after the addition of potassic bichromate. The alkaloid was first isolated by Riegel, in 1845, and its reaction with sulphuric acid was noticed by F. W. Carpenter (see "Amer. Jour. Phar.," 1879, p. 172).

The aqueous solution left after washing with ether was found to be inert in large doses. Therefore the medicinal principles are the sanguinarina, resin and perhaps to some extent the second alkaloid. The resin has an effect similar to that produced by the alkaloid, only not in so marked a degree.

Cider Preservative.—About a year ago I analyzed a sample of a cider preservative that was being sold here at the rate of \$2.00 per ounce; it was simply *salicylic acid*. It has been extensively used here, and samples of cider that have been kept for from six months to a year still have the peculiar flavor of sweet cider, and are sweet cider.

One ounce is sufficient for a barrel of 32 gallons. Put the acid in the sweet cider and mix well, then bung up; it will not ferment. For the preservation of sweet cider salicylic acid is far superior to bisulphite of lime.

F. L. SLOCUM.

CONSTITUENTS OF *FRASERA WALTERI*.

BY GEORGE W. KENNEDY.

In the early part of last year (1880) I received from my friend, Mr. J. U. Lloyd, of Cincinnati, Ohio, a small quantity of powder of a lemon-yellow color, which he obtained from the root of American colombo, with the request that I examine it carefully, as he was under the impression it was identical with that isolated by me from the root of *Frasera Walteri* in 1873 (*Proc. Am. Phar. Asso.*, 1873, p. 636). Later in the year I received another small quantity by mail from the same gentleman.

In appearance the powder or very small crystals, which they appeared to be, were of the same light yellow color, and very much resembled those obtained by the writer. They were submitted to the same tests as those which were obtained by myself, and their behavior corresponded precisely, again proving conclusively, for the second time, that the root of American colombo contains constituents identical with those of *Gentiana lutea*, and that the two roots are closely analogous; the only difference I was able to discover was that the *frasera* contained more of the yellow acid (gentisic acid), and the gentian more of the bitter principle (gentio-picrin).

The substance obtained from Mr. Lloyd was submitted to additional experiments. With ferric chloride it produces a deep green-black color, and in this respect is similar to that obtained by Prof. Maisch from the root of gentian (*Am. Jour. Phar.*, 1880, p. 1-4). It is the same substance which led a number of pharmacists to believe that gentian root contained tannin. When treated with a solution of gelatin a very delicate precipitation was observed after standing about 8 hours. The substance was found to be decidedly more soluble in hot water than cold, the former producing a pronounced lemon-yellow solution, whilst in the latter the water was hardly tinged.

Factitious Tea has again been observed in Russia by E. Johanson, one specimen consisting altogether of the leaves of *Epilobium*.—*Phar. Zeitsch. f. Russl.*, 1881, p. 231.

POISONING BY ANACARDIUM OCCIDENTALE.

BY HENRY FISHER.

The writer, while engaged in making an acetic extract of anacardium occidentale, in which he was obliged to use heat with the object of reducing a liquid extract of said drug to a solid consistence, met with the following severe experience.

As there was no draught of air to dissipate the fumes as they arose during the process of the manufacture, the operator necessarily being subjected to them, was unconsciously receiving their effects in the parts of his face and neck that were exposed; this transpired in the afternoon. The first evidence of ill effects that he experienced was a slight itching, attended by a burning sensation on touching the forehead, which occurred during the night after he had retired. Upon rising in the morning, not imagining any ill-effects from the experience of the afternoon previous, he was at a loss to account for the condition in which he found his head, which appeared to be in an indefinable abnormal state. Upon gazing into a mirror, it was found that the forehead and the surface surrounding the right eye were so swollen and inflamed as to interfere with the sight of that organ of sense, the left being but slightly swollen. He continued his daily avocation under much difficulty, owing to the pain and swelling of the face, which continued to grow more intense each moment, until at last towards the close of the day he was obliged to appeal to a neighboring physician for advice, as his face had become so swollen as to almost obscure the sight. It was thought, as the nature of burns was acid, that an alkali would obviate the trouble. This was accordingly promptly resorted to in the form of bicarbonate of sodium. After a half hour's intense pain from this treatment, with no perceptible effect further than to excite the inflamed parts, it was relinquished, and, on the physician's advice, cloths saturated with cold water were applied during the remainder of the evening, affording slight relief. In the morning it was deemed expedient to use a solution of acetate of lead and water. Accordingly, the parts affected were bathed, and cloths saturated with the solution were applied frequently. The effect of this treatment was transient, and only existed while the surface was moistened with the solution, affording relief and tending to check further inflammation and swelling. The next morning the eyes were closed, and the swelling, together with the inflammation, had extended

to the covering of the whole surface of the face and neck, with great prospects of extending further. The physician, apprehending serious effects if the spreading of the poison was not checked, considered that vigorous treatment was absolutely necessary, hence the resort to painting the face and neck with tincture of iodine, the application of which produced excruciating pain. The poison now, for the first time, received its check, and, by frequent application, the swelling gradually subsided, and the inflammation, together with the redness attendant on it, grew less until, in the course of two or three days' treatment, the injured parts were restored to a normal condition, with the exception of the old skin peeling off in fragments in yielding to the new skin which was forming.

The writer submits the above with the hope that others who have not had any experience with the above drug might profit from his experience and use the necessary precautions, and those who through misfortune might become similarly situated might profit from the result of the treatment in his case.

Philadelphia, May, 1881.

NOTE BY THE EDITOR.—It is well known that the dark colored oily juice of the pericarp of the cashew nut produces a very painful and persistent eczematous eruption, due to *cardol*, which was isolated by Staedeler in 1847 as a yellowish oil, having, on heating, a faint, agreeable odor. Although cardol is stated not to volatilize without decomposition, yet the vapor arising during the roasting of the cashew nut is apt to cause severe and painful inflammation and eruption unless great caution is used. This would seem to indicate that by the aid of other vapors cardol is partly volatilized.

Little is known concerning the chemical behavior of cardol, but since its solution is not precipitated by pure lead acetate this salt will probably be of little service against the effects of cardol. Basic acetate of lead seems to promise better results, at least in the earlier stages of cardol poisoning, since this compound produces, with cardol, a white precipitate which, on exposure to the air, rapidly acquires a reddish and red-brown color.

It is worthy of note that, according to Buchheim, three or four drops of cardol may be swallowed without producing any marked effects; but it should also be remembered that the crude oil applied to the lips produces, in a very short time, very painful blisters.

ACAROID RESIN.

PORTSMOUTH, N. H., May 18th, 1881.

Editor of the American Journal of Pharmacy:

DEAR SIR—Your article published in the JOURNAL for this month on "The Xanthorrhœa Resins" brings to my memory the fact that I have a small package of gum acroides—so spelled—which I purchased at "the North End" in Boston, Mass., in 1845, the occasion being the selling out and giving up of the apothecary business by Hon. J. Warren Merrill, now of Cambridgeport, Mass., with whom I was a clerk at the time. Previous to this, I was an apprentice with Mr. Joseph M. Smith, one of Boston's old and trusted apothecaries, who at that time was in business on Washington street, directly opposite the foot of School street; the number of his shop was 138, but since the extension of Washington street, the number has been raised. At this place also there was a package or two of gum acroides. I am under the impression that it was never sold for medicinal purposes, but so far as I remember was sold with other resins—say with benzoin, mastich, sandarach and shellac—for varnishes and so-called French polishes. This, you see, was some thirty-six or forty years ago. The appearance of the packages—they were in stout brown paper, and I can see them very plainly—was such as to lead one to suppose they had been in use for many years.

I have no doubt that gum acroides had then been sold in the Boston market for many years. The sale in Boston, from 1840 to 1845, was quite small; I don't suppose we sold a pound a year. I also remember to have seen it in some other drug stores, most likely in some wholesale houses. I remember, especially, having seen it spelled acroides, and I also remember very well thinking they did not know how to spell at *that* shop. I am very confident that in the old books of that time, to which I had access, I never saw it spelled in any other way than acroides. The weight of evidence, as presented in your paper, seems to prove that acaroides is the proper way in which to spell this old-new resin. Very truly yours, JOSEPH H. THACHER.

COLOR REACTIONS OF ALKALOIDS, ETC.

In a thesis presented to the Philadelphia College of Pharmacy, Benj. B. Hamlin, Jr., Ph.G., describes a series of experiments made with a number of proximate principles for the purpose of ascertaining

their behavior to concentrated sulphuric acid and the subsequent effect of oxidizing agents, of which at first a minute quantity of potassium bichromate was added, and afterwards a solution of chlorinated lime. The proximate principles experimented with were of good commercial quality. The sulphuric acid employed probably contained traces of nitric acid, which appears to have modified the color in several instances. With sulphuric acid, in as pure a state as he could prepare it, Dragendorff found that morphia and caffeine remain colorless after 20 hours, and even the pale rose color obtained by him with brucia is considered as being most likely due to a minute trace of the impurities mentioned. The results obtained by Mr. Hamlin are as follows:

Principle.	H ₂ SO ₄ .	K ₂ Cr ₂ O ₇ .	Chlor. Lime.
Aconitia,	Yellowish-brown,	Green,	Greenish-yellow.
Atropia,	None,	Dark green,	Fading.
Brucia,	Pink,	Bright red,	Light green.
Caffeina,	Green,	Darker,	No change.
Cinchonia,	None,	Green,	Yellow.
Cinchonidia,	None,	Green,	Yellow.
Codeina,	None,	Black,	Fading.
Digitalin,	Black-brown,	Green,	No change.
Emetina,	Brown,	Green,	No change.
Gallic acid,	None,	Green,	Disappears.
Mannit,	None,	Deep green,	Lighter.
Morphia,	Light pink,	Dirty brown,	Disappears.
Piperina,	Blood-red,	Very dark,	Disappears.
Quinia,	None,	Green,	Disappears.
Quinidia,	None,	Green,	Disappears.
Salicin,	Blood-red,	Darker,	Disappears.
Strychnia,	None,	Deep violet,	Disappears.
Tannin,	Golden-yellow,	Muddy,	Disappears.
Veratria,	Deep red,	Reddish-brown,	Light green.

Maurice Robin has published in "Revue Scientifique" some observations on the effect of sulphuric acid in the presence of sugar. After mixing the compound with twice its weight of cane sugar a small quantity of the mixture is placed on a porcelain slab, one or two drops of pure sulphuric acid are added, and the mixture is stirred with a glass rod. Manipulating in this way, the production of colors was observed to be as follows:

Atropia sulphate, violet, deepening, finally brown.

Codeina, cherry-red, changing to violet.

Morphia hydrochlorate, rose, rapidly changed to violet; persistent.

Narcotina, mahogany color, persistent; very characteristic.

Quinia sulphate, greenish, bright yellow, finally blackish-coffee color, with a yellow margin.

Salicin, bright red.

Strychnia, reddish, changing to blackish-coffee color.

Veratria, dark green.

The admixture of sugar with codeia and some of the other substances which in their pure state are not affected by sulphuric acid, may be detected by the addition of a few drops of this liquid. If sugar of milk be used in place of cane sugar, the color above described does not appear with quinia, and is much less intense with morphia and codeia.

SOLUBILITY OF SODIUM AND POTASSIUM SALTS.

BY JOHN FRANCIS LOEHLE, PH.G.

From an Inaugural Essay.

The author has determined the solubility in water of the medicinal salts of sodium and potassium of fair commercial quality. The first columns under *B* and *C* give the number of grains dissolved by 75 cc. or $\frac{1}{2}$ fluidounce of distilled water.

A Name.	B Temperature 60°F. In parts.			C Temperature 80°F. In parts.			D Solution.
	Grains.	Salt.	Water.	Grains.	Salt.	Water.	
Sodii acetat,	214	1 in	1·63	334	1 in	0·68	Clear.
Bicarbonas	17	1 in	13·38	22	1 in	10·34	"
Boras,	9	1 in	25·27	14	1 in	16·25	"
Bromidum,	203	1 in	1·12	224	1 in	1·01	"
Carbonas,	128	1 in	1·77	216	1 in	1·05	"
Chloridum,	78	1 in	2·91	79	1 in	2·88	"
Hypophosphis,	241	1 in	0·94	268	1 in	0·85	Milky.
Hyposulphis,	360	1 in	0·63	436	1 in	0·52	"
Iodidum,	394	1 in	0·58	463	1 in	0·49	Clear.
Nitras	179	1 in	1·27	196	1 in	1·16	"
Phosphas,	32	1 in	7·11	72	1 in	3·16	"
Sulphas,	77	1 in	2·95	120	1 in	1·89	"
Sulphis,	140	1 in	1·62	155	1 in	1·46	"
Potassii acetat,	374	1 in	0·60	502	1 in	0·45	Milky.
Bicarbonas,	67	1 in	3·39	79	1 in	2·88	Almost clear.
Bichromas,	21	1 in	10·83	30	1 in	7·58	{ Clear. Reddish yellow.
Bromidum,	132	1 in	1·72	146	1 in	1·55	Clear.
Carbonas,	350	1 in	0·65	385	1 in	0·59	Milky.
Chloras,	13	1 in	17·5	17	1 in	13·38	Clear.
Citras,	339	1 in	0·67	388	1 in	0·58	Milky.
Cyanidum,	167	1 in	1·36	177	1 in	1·22	Clear.
Ferrocyanid.,	58	1 in	3·92	77	1 in	2·95	{ Clear. Pale straw.
Hypophos- phs,	} 300	1 in	0·75	362	1 in	0·61	Milky.
Iodidum,		325	1 in	0·70	336	1 in	0·67
Nitras,	49	1 in	4·64	84	1 in	2·70	"
Sulphas,	21	1 in	10·83	26	1 in	8·75	"
Sulphis,	27	1 in	8·42	40	1 in	5·66	Milky.
Sulphuret,	406	1 in	0·56	509	1 in	0·44	{ Clear. Brown yellow.
Tartas,	310	1 in	0·73	352	1 in	0·64	Milky.

NOTE BY THE EDITOR.—The author has omitted to state the method by which the solubility has been determined. In a number of the above cases the milkiness is probably due to the presence of silica; as in carbonate, acetate and citrate of potassium, or to calcium tartrate in potassium tartrate.

EMULSIONS.

BY EMIL G. H. GRAFF, PH.G.

From an Inaugural Essay.

An emulsion is an intimate mixture of an oily, fatty or resinous substance with water by means of a mucilaginous or albuminous binding medium. In entering into emulsions these substances do not undergo a chemical change, but only a physical one, the force of repulsion between the oils, fats, resins and water being overcome by the binding medium in the following manner: Each globule of the oily, fatty or resinous matter is enveloped in a thin film of the binding medium and in this way becomes miscible with water in any proportion.

NATURAL EMULSIONS.

The milk of mammals and the milky plant juices are prototypes of emulsions. In the former casein holds the fatty substance, butter, in suspension in the aqueous part, and in the latter vegetable albumen performs the office of binding medium.

ARTIFICIAL EMULSIONS.

The artificial emulsions, the preparation of which belongs to the duties of a pharmacist, may be divided into five classes.

Class 1. Emulsions of oils, liquid balsams, oleoresins, resinous fluid extracts and tinctures.

These substances are generally emulsified by means of gum arabic, occasionally use is also made of yolk of egg, gum tragacanth and tincture of soap bark.

A. GUM ARABIC.—In emulsifying these substances with gum arabic two different methods of manipulation are in use.

First Method.—One part of gum arabic is rubbed up in a mortar with one and a half part of water, until a perfectly smooth mucilage is obtained; then two parts of oil are added in small quantities at a time, taking care, however, to emulsify each portion thoroughly before adding another, and if necessary, *i. e.*, when the emulsion becomes too

thick, adding water and oil alternately. Lastly the remainder of the water is gradually incorporated.

Second Method.—One part of gum arabic is triturated with two parts of oil, then one and a half part of water is poured in at once, the mixture stirred briskly until the emulsion is formed and then diluted with the remainder of the water.

After a series of careful experiments, I propose the following method as giving the most satisfactory results and call it the

*Third Method.*¹—Take one part of gum arabic, triturate it with two or more parts of oil, then add two parts of water at once, stir briskly until the emulsion is formed, lastly add the remainder of the water. The difference between the second and third method is, that in the latter two parts of water are always to be taken to one part of gum arabic, independent of the quantity of oil used.

With these three methods I have succeeded in making perfect and stable emulsions, but a number of carefully conducted experiments has taught me that the third is the best, next in order follows the second and then comes the first.

Advantages of the second and third methods over the first.

1. The making of a smooth mucilage of gum arabic requires considerable more time than triturating the gum with the oil. To overcome this difficulty, some pharmacists are in the habit of triturating the gum arabic with half its weight of sugar. But an addition of sugar will retard emulsification to such an extent that it would be saving time to make the mucilage without the sugar.

2. Emulsification takes place much more rapidly when adding the water to the mixture of gum and oil than if the oil is stirred with the mucilage.

3. Essential oils, which are generally considered difficult of emulsification, are made into emulsions with the greatest ease when using the second and third methods. An emulsion of oil of turpentine affords a striking illustration of this fact, which will convince the most skeptical.

Advantages of the third method over the second.

1. The difficulty of emulsifying large quantities of oil with small

¹ For methods of emulsionizing not mentioned by the author, consult papers by J. Winchell Forbes, "Amer. Jour. Phar.," 1872, p. 61; L. v. Cotzhausen, *ibid.*, 1878, p. 284; and Ph. H. Dilg, *ibid.*, 1878, p. 326. The third method is essentially that of A. W. Gerrard, *ibid.*, 1880, p. 560.—Ed.

quantities of gum is entirely overcome by performing the process as directed in third method. I emulsified in this way castor oil and cod liver oil, the former with four scruples and the latter with one drachm of gum arabic to the ounce.

2. The operator may add the remainder of the water to an emulsion made according to the third method in any manner, while, when made according to the second method, care must be taken not to pour too much water in at once, as it is apt to spoil even then a carefully made emulsion.

In summing up these facts, I consider that emulsification is best performed by triturating the gum arabic with the oil and then adding the water, because even the inexperienced operator will hardly fail to succeed; and, last but not least, it takes far less time.

The relative quantity of gum arabic and oil to be used are in their best proportions when two parts of the oil are emulsified with one part of gum arabic. The clicking sound, which is heard when an emulsion is nearing its completion, and which is the most certain sign of having succeeded, is loudest when the ingredients have been used in this proportion. Besides this clicking sound, the fact of the emulsion being a success may be inferred from the fact that the inside of the mortar is continually and completely moistened with a milk-like covering of a permanent character. If, however, drops of oil appear on the surface and the liquid in running down the sides of the mortar leaves them as if they had been moistened with water only, the emulsion is on the point of "cracking," as the technical term that is applied to a spoiled emulsion styles it. When this occurs some mucilage may be added, which will often have the desired effect; but trying to improve a cracked emulsion is seldom of much avail, as it never affords an elegant and stable preparation. It may be done, however, by making a small quantity of a new emulsion and incorporating the spoiled one gradually.

B. GUM TRAGACANTH.—In using gum tragacanth for emulsification I adopted a plan somewhat different from that which is followed when gum arabic is the binding medium. I triturated $\frac{1}{12}$ part of the gum with one part of water, then added two parts of oil together with another part of water and stirred until the emulsion was formed. This method of manipulating gave very satisfactory results.

Gum tragacanth is, however, not often employed, but would be a well-adapted binding medium for a 50 per cent. emulsion of cod liver

oil and similar preparations, in which large quantities of oil are desired to be emulsified with as small a quantity of gum as possible.

C. YOLK OF EGG.—This substance is also seldom used. In the preparation known as St. John Long's Liniment this binding medium is employed and is well adapted for emulsifying oil of turpentine, because the fixed oil of egg combines with the essential oil of turpentine and in this way renders emulsification easier.

Another instance where yolk of egg has the office of binding medium is the official *Mistura Chloroformii*, which might be called an emulsion, as a substance nearly insoluble in water is suspended in it by means of yolk of egg.

D. TINCTURE OF SOAP BARK.—The attention of the profession has in the last two years very frequently been called to the emulsifying properties of this tincture, though this preparation was occasionally used for the formation of emulsions since 1850. All the emulsions made by means of tincture of soap bark separate into two layers, which are, however, easily and thoroughly mixed on agitation.

Class 2. Emulsions of semi-liquid and solid balsams, solid fats and camphors.

This class of emulsions is not an important one.

On the continent of Europe and in England pharmacists are sometimes called upon to prepare emulsions of wax, spermaceti and butter of cacao, for lotions for the hands, etc. These fats are emulsified by melting in a mortar one part, triturating it with one part of gum arabic, and then adding gradually one part and a half of water of a temperature of 90° to 95°C. and stirring until thoroughly combined. After cooling, the emulsion is to be diluted very carefully to the desired extent.

This operation is greatly facilitated by the addition of a small quantity of borax, and if the preparation is intended for a lotion, this addition is a very good one, not only on account of its cleansing properties, but also because borax coagulates a mucilage of gum arabic, and consequently gives the preparation more body and stability. One scruple of borax is sufficient for one fluidounce of emulsion.

In the same way as solid fats, the semi-liquid and solid balsams may be emulsified. Sometimes they are dissolved in alcohol, ether, chloroform or other solvents, and then they would have simply to be treated as the substances mentioned under Class 1.

Camphor is either emulsified by dissolving it in the smallest possi-

ble quantity of alcohol or olive oil and then treating it as belonging to Class 1, or by rubbing one part very finely pulverized camphor with ten parts of gum arabic and sugar, and then adding water gradually.

Under this class might yet be mentioned an emulsion of phosphorus. This is dissolved in a mucilage of gum arabic with the aid of heat, and is then easily divided. It would, however, be much more proper to administer this powerful drug by emulsifying oleum phosphoratum.

Class 3. Emulsions of gum-resins.

These preparations, of which a few are officinal in the U. S. P. under the name of *misturæ*, are made by simply rubbing the gum-resin reduced to a fine powder with water, and in this way bringing them back again to the state of milky plant-juices, as which they were obtained from nature. The vegetable albumen or gum contained in the gum-resins serves as binding medium. The only difficulty in making those preparations is the reducing of the gum-resins to a fine powder. By placing the mortar in a hot water bath, this operation will be greatly facilitated. After a very fine powder has been obtained, the water is added in small quantities at a time, beating the mass at first and then stirring, after more water has been added, very briskly, levigating the finest particles, and repeating this operation until nothing or only impurities are left. In order to prevent the evaporation of volatile oils which the resins may contain, on placing them in a hot water bath, it is well to sprinkle a little water over them.

Some pharmacists are in the habit of beating the gum-resin with gum arabic in pieces, which is, however, not necessary and inadmissible unless the physician or the Pharmacopœia directs this addition.

Class 4. Emulsions of resins.

This class of preparations differs from the foregoing only by the fact that they cannot be made without the addition of a binding medium. They are treated in the same manner as gum-resins, after having mixed half a part of gum arabic with the finely powdered resin. *Resina jalapæ* and *resina scammonii* cannot be rendered miscible with water by means of gum arabic except by using from 10 to 20 parts of the latter. A much better plan is to beat the resins into a pulpy mass with a few sweet almonds, deprived of their skins "*via frigida*," and diluting with water.

Class 5. Emulsions of seeds.

They are made from seeds and fruits containing large quantities of

oil. The most important and frequently prescribed emulsions of this class are those made from sweet and bitter almonds, the seeds of poppy, pumpkin, watermelon and the fruits of hemp and lettuce. Two methods of manipulating are followed.

First Method.—The seeds are powdered and passed through a sieve of 80 meshes to the linear inch, and then suspended in water by means of gum arabic.

Second Method.—The seeds are introduced into a brass, porcelain or wedgwood mortar, moistened with a little water and contused with considerable force. Water is added in a small quantity at a time, and after each addition the beating is renewed. The emulsion is to be strained through a white cloth without pressure. The vegetable albumen contained in these seeds serves as binding medium between their oil and water. Upon the force used and the industry of the operator depends the success of the emulsion, which, when perfect, must have a thick consistency and an opaque white appearance. If the emulsion looks bluish-white and is somewhat transparent, the operator has saved his muscles. While the second method furnishes a very elegant preparation, the first one produces a mixture which a patient will view with horror and disgust.

The emulsion of sweet almonds, which is officinal under the name of *mistura amygdalæ*, is made according to the second method with the modification of blanching the almonds, because their skins would impart a color to the preparation. This is generally done by scalding them with hot water, but as a certain quantity of emulsin is thereby coagulated, maceration for half an hour in water of a temperature from 50° to 60°C. is to be preferred. A still better plan is to let them macerate for 6 or 8 hours in cold water, especially in case no additional binding medium is employed, as in the emulsion for almond syrup, U. S. P.

A very obsolete preparation is the emulsion of lycopodium, which is prepared by rubbing the powder in a perfectly dry mortar with strong pressure, until it loses its peculiar liquid appearance and becomes lumpy, then water is added gradually.

European physicians sometimes prescribe an emulsion of koosso, which is, however, not a proper emulsion. The drug is finely pulverized and then suspended in mucilage of gum arabic.

INCOMPATIBLES.

If other ingredients have to be added to an emulsion, the following rules are to be observed :

1. Never add to an emulsion hot liquids. This rule is important when, instead of water, the emulsion has to be made with an infusion or decoction, such liquids must be allowed to cool perfectly before using them.

2. When sugar, syrup, extracts, acids, salts, alcohol and ethereal liquids have to be added, the emulsion is to be diluted previously to the fullest extent possible. Among the salts, the lead and iron salts require the most caution. Acids, tinctures, especially those made with strong alcohol and spirit of nitrous ether, are first diluted with water before adding them to emulsions. Borax added to an emulsion made with gum arabic coagulates with the gum to a thick paste. A sufficient quantity of sugar or syrup will dissolve it again.

The most difficult addition to an emulsion is tincture of chloride of iron. By diluting, however, both the tincture and the emulsion to the fullest extent possible and then adding the diluted tincture in small quantities at a time, even this can be added.

CHEMICAL NOTES.

BY PROF. SAMUEL P. SADTLER, PH.D.

INORGANIC CHEMISTRY.—*Supposed Existence of Ice at High Temperatures.*—In the February number of this journal (p. 58), we noted the striking experiments of Dr. Thomas Carnelley on the conditions of fusion of ice, from which it appears that when the pressure in the flask was reduced below the point of *critical pressure* (4.6 mm. for ice), no application of heat sufficed to melt the ice. Dr. Carnelley drew from this the conclusion that the ice, under this condition, could really be heated far beyond its ordinary fusing-point. Prof. Lothar Meyer, of Tübingen, and J. B. Hannay, of Glasgow, have recently given, independently of each other, what seems to be the truer explanation of this phenomenon. They both show by crucial tests that the ice at no time becomes hotter than the temperature of the body of the flask or receiver, in the neck of which the thermometer-bulb projects, which must be below zero; so that when the pressure is reduced below the critical point (4.6 mm.), ice will volatilize without melting,

but no application of heat brings its temperature above zero C.—*Ber. Chem. Ges.*, xiv, p. 718, and *Nature*, March 31st, 1881.

A New Method for the Manufacture of Potashes.—Potassium chloride, that abundant product of the Stassfurt salt deposit, can be changed direct into the carbonate, according to E. Engel, by the following procedure: Magnesia or magnesium carbonate is added to the aqueous solution of potassium chloride and the mixture is then treated with carbon dioxide gas. Magnesium bicarbonate forms at first, this dissolves and then reacts with the potassium chloride to form magnesium chloride and a crystalline double salt ($\text{MgCO}_3, \text{KHCO}_3$) which separates out according to the following reaction: $3\text{MgCO}_3 + 2\text{KCl} + \text{CO}_2 = 2(\text{MgCO}_3, \text{KHCO}_3) + \text{MgCl}_2$. This double salt, which had already been prepared by Berzelius and St. Clair Deville from magnesia and potassium bicarbonate, is decomposed by heating with water into potassium carbonate and magnesium carbonate which separates out. In this process a part of the potassium chloride escapes decomposition. The mother liquor of the double salt is therefore evaporated, and from it either carnallite or potassium chloride will crystallize out. The process is patented and is now being carried out on a large scale at Montpellier.—*Compt. Rend.*, 92, p. 725.

Preparation of Hydrochloric Acid.—Ernest Solvay, of Brussels, has taken out an English patent, No. 837, for the preparation of hydrochloric acid gas. His method is based upon the fact that a concentrated aqueous solution of calcium chloride holds back water at a temperature at which it will not absorb hydrochloric acid gas. If a mixture of hydrochloric acid gas and air is therefore led into a concentrated solution of calcium chloride, the air escapes while the hydrochloric acid and water are held back. When the solution is heated, the hydrochloric acid gas escapes in a perfectly dry state. When the hydrochloric acid gas is mixed only with steam or vapor of water, the calcium chloride solution is simply kept at a temperature at which it holds the water but allows the dry hydrochloric acid gas to escape. The gradual dilution of the calcium chloride solution is counteracted by addition of dry calcium chloride from time to time.

From aqueous hydrochloric acid the gas is also liberated in a dry state on addition of calcium chloride and heating.—*Chem. Indus.*, April, 1881, p. 117.

Production of Alkaline Cyanides.—Victor Alder, of Vienna, has taken out a German patent, No. 12,351, of 11th of March, 1880, for

the production of cyanides of the alkalies and alkaline earths. Starting out with the cyanide-formation in the Leblanc process, he finds as the results of his studies that the cyanides of the alkali metals as well as of the alkaline earths are formed when :

1. Their oxides, hydrates or carbonates are ignited with charcoal in a nitrogen atmosphere, in which case an addition of finely divided iron is especially helpful ;

2. When the sulphates or sulphides, mixed with calcium carbonate and charcoal, are ignited in a nitrogen atmosphere, either with or without the addition of iron ;

3. When the sulphates or sulphides, mixed with charcoal and a metal which has when heated a strong affinity for sulphur, such as iron, zinc, copper, are ignited in a nitrogen atmosphere ;

4. When the sulphides of the alkaline earths are changed into oxides or carbonates by ignition with hydrocarbons and then treated as in section 1.

The inventor proposes the following process : Wood charcoal, coke, sawdust and so forth are saturated with a solution of the alkaline or alkaline-earth salt. Or pulverized charcoal is saturated with the solution and a mass is then made up with sawdust or half-charred wood. The iron is incorporated as metallic powder, or the charcoal having been saturated with ferric chloride or sulphate solution, is dried and ignited in a current of steam.

The materials, so prepared, are ignited in retorts into which nitrogen gas is conducted. This nitrogen gas is prepared by passing atmospheric air through a series of tubes in which it gives up its oxygen to alkaline sulphides, such as barium sulphide, solutions of which saturate various porous materials.—*Ibid.*, pp. 117–118.

ORGANIC CHEMISTRY.—*On the Change of Glucose into Dextrine.*—In the year 1872, Musculus prepared, by the action of concentrated sulphuric acid upon glucose, a compound which he considered to be a dextrine. Later, Gautier, by the action of hydrochloric acid gas upon glucose, prepared a compound, $C_{12}H_{22}O_{11}$, and Musculus, in connection with Meyer, now repeats his experiments with sulphuric acid for the sake of comparison. Pure glucose (30 grams) was fused in a chloride of calcium bath, and after this had cooled an equal weight of concentrated sulphuric acid was added in 4 or 5 successive portions. The mass, which was kept stirred, must not rise above 60° . It was then treated with absolute alcohol (800 grams), and the filtrate allowed to

stand for a week. The abundant precipitate which forms is then washed, first with cold and then with boiling absolute alcohol. The product so obtained (10 grams) is a white amorphous hygroscopic but not deliquescent powder, which contains alcohol and has the composition $C_{18}H_{28}O_{14} \cdot C_2H_6O$. It loses the alcohol at 110° and remains as a very hygroscopic and deliquescent powder. On boiling with water the alcohol compound is decomposed and there is obtained a substance of the composition $(C_6H_{10}H_5)_3 = C_{18}H_{28}O_{14} \cdot H_2O$, a yellow amorphous mass, very easily soluble in water, of sweetish taste, which is not colored by iodine, is precipitated by alcohol from aqueous solution, only slightly reduces Fehling's solution, possesses a rotatory power of 131° to 134° , is not brought to fermentation by yeast or by diastase, but by several hours' boiling with 4 per cent. sulphuric acid is changed into sugar. Musculus considers it like the γ -dextrine described by him previously.—*Compt. Rend.*, 92, p. 528.

Gallic Acid Reaction.—According to Dudley, ammonium picrate added to gallic acid solutions, produces at first a reddish color which after a few seconds changes into a fine green. Pyrogallic acid and tannin give also a reddish color but it is not further changed.—*Chem. Industrie*, April, 1881, p. 129.

TECHNICAL CHEMISTRY.—*Fatty Acids and Allied Products.*—Prof. J. W. Mallet, in his review of recent advances in applied chemistry, gives the following: In the important manufacture of the fatty acids, the three processes now chiefly in use are, 1st. Decomposition by means of sulphuric acid and distillation with the aid of superheated steam; 2d. Saponification by lime in closed vessels under pressure, and decomposition of the lime-soap by sulphuric acid; 3d. Saponification by lime as before, followed by treatment with a small excess of sulphuric acid and distillation in a current of superheated steam.

Lime is chiefly used by the smaller manufacturers, sulphuric acid, followed by distillation, in the larger establishments. By far the most interesting novelty in this field of industry is the appearance in the market, introduced by two French manufacturers, of palmitic acid artificially made from oleic acid by heating with strong potash lye at 300° to $325^\circ C.$, thus producing potassium palmitate and acetate, to be separated by washing with a limited quantity of water, the former salt to be then decomposed by sulphuric acid. The quantity of caustic potash required is said to be large—twice the weight of the oleic acid treated—but it is recovered, the acetate of potassium being

calcined and converted into carbonate to be causticized with lime, while the palmitate is either decomposed with sulphuric acid as just mentioned and the sulphate of potassium converted into the carbonate by the Leblanc process, or palmitate of calcium is formed by heating with lime under pressure, caustic potash being thus directly reproduced and the lime-salt afterwards decomposed by sulphuric acid. The value of the principal by-product of the fatty acid manufacture, glycerin, constantly increases as its useful properties are applied in new directions and upon a continually larger scale. As a solvent in pharmacy, in connection with perfumery and various articles of food, as a preservative of animal and vegetable substances from decay, as an ingredient in the manufacture of beer, as the means of keeping moist and soft such articles as chocolate, tobacco and soap, as preserving the pliancy of leather and maintaining the softness and delicacy of the living skin, as a lubricant, in admixture with water to guard gas-meters against stoppage by freezing, as the material for making nitroglycerin and in sundry other directions this substance, twenty-five years ago but little known or used, has acquired an important place in general consumption. While its price has been greatly lowered, the state of purity in which it is placed upon the market has been improved until now there is but little left to be desired in this regard.—*Amer. Chem. Jour.*, iii., p. 60.

TESTING OF PERU BALSAM.

BY PROF. F. A. FLÜCKIGER.

Translated from "*Pharm. Ztg.*," 1881, No. 30, p. 222. BY FRED. B. POWER.

Peru balsam is a mixture of about two-thirds, or somewhat less, of benzyl cinnamate, the so-called cinnamein, with one-third or more of a brownish-black resin, besides some few per cent. of cinnamic acid. These chief constituents are not always present in the same amount, and are most probably accompanied, although in a subordinate degree, by other bodies, *e. g.*, benzylic alcohol, cinnamyl cinnamate (styracin) and benzoic acid. Even the specific gravity of the balsam, which at 15°C. varies from 1.140 (or perhaps 1.138 as minimum?) to 1.145 (or 1.147 as extreme maximum?), indicates that the proportionate amount of its constituents varies, although, indeed, within narrowly-confined limits. The high price of the balsam invites to sophistication, which, in consequence of the thick consistence and dark brown color, is made

very easy. To the observing eye, however, many additions will become at once apparent from the *thread-like attenuated drops*, which are not observed with the pure balsam. This observation appears, indeed, to possess considerable value in this case.

The sophistication of Peru balsam has probably for some time been exercised to a considerable extent, but for some years past, as it appears, particularly in Hamburg and Bremen, has attained quite a prominent significance, so that the means of detecting such adulterations have been repeatedly considered in the pharmaceutical literature of the day. Colophony, benzoin, liquefied with a little alcohol, styrax, copaiba, and even castor oil, are named as admixtures of which the adulterators make use; as all these substances are lighter than Peru balsam, one would think that the adulteration, even with all ingenuity, would be very much confined in its practice. As soon as the specific gravity becomes decreased below 1.14 or, perhaps, below 1.138, the article becomes suspicious. The price relations grant to the adulterator, however, even with slight admixture, a sufficient reward, when he exercises his profession on a somewhat larger scale, which indeed appears to be the case.

A rational test of the balsam should be founded first upon the above-mentioned physical observations, and then upon the chemical properties of the chief constituents. The author has previously (compare his "Pharmakognosie," 2d edit., 1881, p. 127, 128) observed the adaptation of the cinnamein to this purpose, which may be obtained with the greatest facility, though not perfectly pure, when the balsam is shaken with three times its weight of carbon bisulphide. The latter becomes only slightly colored when a pure article is employed, while the adulterated often yields a very dark colored solution. After a series of experiments in this direction, however, the author considers the amount of cinnamein present altogether too variable to admit of the determination of definite limits, or perhaps more correctly expressed, the relation of cinnamein to carbon bisulphide is altogether too much conditioned by the possible admixtures as to admit of its quantitative estimation. The cinnamein may be obtained more pure by means of the lower boiling fractions of petroleum. This solution is almost entirely colorless, and leaves, after the evaporation of the petroleum, as is known, a very fragrant cinnamein, amounting to about half the weight of the balsam, thus far less than by the application of carbon bisulphide. For the estimation of the value of Peru balsam, a petro-

leum boiling at 50° to 70°C . may be very well adapted; the yield must be determined by testing numerous samples of the balsam. It would be a progressive step if the balsam were directly abandoned, and in its stead the cinnamein extracted by petroleum introduced; although in opposition thereto is the fact that the odor of the cinnamein thus obtained, which presumably is never perfectly pure benzyl cinnamate, by no means precisely represents the odor of the crude balsam. Furthermore, such a purification of Peru balsam would double or treble its necessarily high price without, however, offering a very great advantage.¹ By such a procedure the adulteration would be crippled, in as far as serviceable figures for the limit of the amount of cinnamein may be determined. The author is at present not inclined to advise directing the determination of the cinnamein, for example in the Pharmacopœia; but a reliable method of testing the balsam will be given below, which is based upon the fact that cinnamein is quite stable in its behavior towards alkalies.

Besides the cinnamein, the *resin* of Peru balsam may be also employed as a test, which is already the case in the German Pharmacopœia of 1872. The resin can be separated much better, as above mentioned, by means of carbon bisulphide or petroleum. The amount of this resin in a pure balsam appears to exceed one-third, and, indeed, to amount to about two-fifths; most of the admixtures will have the effect of decreasing the weight of the resin separated by carbon bisulphide or petroleum, and inversely, to increase the amount of the portion taken up by those liquids, *i. e.*, apparently to furnish more cinnamein. As the cinnamein and resin are determined in the same operation, the same objections apply to the latter as to the quantitative estimation of the cinnamein. In a like manner the property of this resin, on the other hand, of not being rapidly attacked by alkalies, is of value.

In the third place, the free acid which occurs in the balsam, chiefly cinnamic acid, offers a point of attack of which the German Pharmacopœia has also already made use, although in a manner which leaves

¹It may here be called to mind that vaseline also extracts from Peru balsam principally the cinnamein, the odorous principle, while the odorless resin is separated just as well as by mixing the balsam with liquid petroleum. When, therefore, the objection is made that vaseline (German) does not mix with Peru balsam, it is only to be referred to that behavior which, practically, must be regarded as an advantage.

room for doubt; for in what manner can it be determined that 1,000 parts of balsam are neutralized by 75 parts of sodium carbonate? The execution of this experiment is not quite so simple as it would appear in this laconic requirement. Should the balsam be boiled with the finely-powdered carbonate, the action of the same aided by means of water, or must, inversely, the balsam be diluted with alcohol? Good Peru balsam was boiled for a day with an excess of sodium carbonate and 10 times its weight of alcohol (sp. gr. 0.830) in a flask provided with an inverted condenser; 91.6 parts of sodium carbonate were required for 1,000 parts of balsam. It is probable that hereby, finally, not only the free acid is combined with the sodium, but that also a decomposition of the cinnamic ether or cinnamein begins. It appears, therefore, more advisable to extract the free cinnamic acid by means of lime, in that it may be accepted that the latter is without action on the compound cinnamic ether. If, for example, 50 parts of balsam are boiled for two hours with a mixture consisting of 20 parts of lime and 500 parts of water, and renewal of the evaporated water, the boiling mixture filtered and the mass twice washed, employing each time 200 parts of hot water, the cinnamate of calcium is thus obtained in solution. This is evaporated to 200 parts (whereby it becomes more and more of a yellowish color, developing a cumarin odor, which resembles the odor of the legumes of the Peru balsam), and, after supersaturation with hydrochloric acid, is placed for some hours in the cold, whereupon the separated cinnamic acid is collected, after draining pressed between bibulous paper, first dried by exposure to the air and finally on the water-bath. When prepared from pure balsam the acid consists of loose, not smeary, somewhat brownish crystals, the weight of which amounts to $1\frac{1}{2}$ to 2 parts, or from 3 to 4 per cent. Adulterated balsams yield, according to the nature of the admixture, a much less pure cinnamic acid, or they give much more or less than from 3 to 4 per cent. of acid. That cinnamic acid is thus obtained is manifest from the fact that it requires for solution 100 parts of boiling water, while benzoic acid, for example, dissolves at 100°C . in 15 parts of water. Upon cooling the hot, saturated, aqueous solution, the cinnamic acid is, for the most part, again separated. If 2 parts of the crystals, purified in this manner, are shaken in a flask with 1 part of potassium permanganate and 20 parts of luke-warm water, a strong odor of bitter almond oil is developed, the cinnamic acid yielding benzylic aldehyd.

The free cinnamic acid can thus be employed qualitatively and quantitatively as a criterion of the purity of Peru balsam, but too much importance should not be attached thereto. This acid is not to be regarded, like the cinnamein, as an active constituent, and, on the other hand, does not occur to such an amount in the balsam as to be regarded, like the black resin, as a peculiar indicative portion of the mixture. As the free acid always amounts to but a few per cent., the percentage amount would be but little changed even by a large adulteration, except in so far as benzoin is concerned, in which case readily-perceptible large amounts of benzoic or cinnamic acids would be introduced. A large admixture of storax, on the contrary, produced, to the author's astonishment, no correspondingly increased yield of cinnamic acid.

In comparison with most materials which are adapted to its adulteration, the somewhat slighter tendency of Peru balsam to decomposition by the action of alkalies appears to be of service. This peculiarity has already been indicated by Dr. Grote, as he (*"Pharm. Centralh.,"* May 27, 1880, p. 179) recommended 3 to 6 drops of the balsam, *i. e.*, about a quarter cubic centimeter, to be shaken with 2 to 3 cubic centimeters of ammonia, sp. gr. 0.960, or, according to the relations by weight, 2 parts of balsam with about 17 parts of ammonia. The free acid passes into solution, and of the remaining constituents only a small amount is emulsionized, while the chief portion is not at all further changed. From the pure balsam, after one day, a turbid liquid may be decanted, while the residue remains semi-liquid, or very soft; but little is here dependent upon the proportions, as it was found that the balsam shows still the same behavior when it is shaken with only half its weight of ammonia. The action of ammonia upon adulterated balsam, however, is quite different; they solidify after a short time, as Dr. Grote has shown, to a stiff jelly, from which no liquid can be decanted, or they become perfectly hard. Dr. Grote has, however, already indicated that it is chiefly colophony which may be detected in this manner, and that other admixtures, on the contrary, such as benzoin, storax, copaiba and gardschan balsam (wood oil) cannot be recognized by means of ammonia. The same is applicable to the fatty oils, although the adulterators will scarcely make use any longer of castor and other oils, as these can be much too easily detected. Castor oil, one of the heaviest, has the specific gravity 0.96, and must, therefore, sensibly affect the specific gravity of the balsam. If the balsam containing fat

is shaken with carbon bisulphide the latter is taken up by the solvent, whereby an (apparent) increase of the cinnamein will appear. If this is saponified with alcoholic soda, and carbonic acid gas then passed through the liquid, in order to remove the excess of soda as carbonate, the filtrate will contain, besides sodium cinnamate, also the sodium salts of the fatty acids, and these latter would then be separated by boiling water from the acidulated solution of their salts, and from the cinnamic and benzoic acids. The adulteration of pure balsam with fatty oils may, therefore, in the further elucidation remain out of consideration.

For the remaining admixtures which, according to the nature of the case, may be of service to the adulterator, the author believes to have found a good means of recognition, which, with consideration of the already indicated, somewhat confined decomposition of the balsam, was sufficiently apparent.

By boiling with milk of lime there is extracted therefrom, as the above experiments show, for the most part simply cinnamic acid, and upon the filter there remains a soft, friable mass. Slaked lime in a dry condition exerts the same slight action. If two parts of the balsam are triturated with one part of slaked lime, the properties of the mixture are changed no more than would be expected; a smeary, or, at all events, a *soft, kneadable or somewhat friable, readily divisible mass* is obtained, which, even after long exposure in the water-bath, does not harden. The specimens of balsam at the author's disposition which, according to their specific gravity, odor or behavior to Grote's ammonia test, were recognized as adulterated, furnish, on the contrary, *very hard, no longer kneadable masses*, when they are rubbed together with half their weight of slaked lime. The same behavior was shown by specimens of balsam to which styrax, benzoin (evaporated alcoholic solution), copaiba and colophony were added in amounts of 10 per cent. or more. In every case the adulterated balsam solidifies with the lime. This lime test appears, therefore, to be of constant value, and in its simplicity leaves nothing to be desired. If the test is confirmed, it may be exacted that *10 drops of Peru balsam shall furnish with .4 grams of slaked lime a mixture which remains soft*; the amount of lime is here intentionally made somewhat large, 10 drops of balsam weighing scarcely .6 gram. Dr. Grote, who has treated the subject so minutely and successfully, writes that his observations agree with those of the author in regard to the action of the slaked lime. It

would be, therefore, of interest to learn whether indeed the different sorts of pure and adulterated balsam which are furnished by trade correspond to the observations of the author. The testing of Peru balsam would then be confined to the following points:

1. The specific gravity at 15°C. must be between 1.140 and 1.145. More extended experience will be required in order to decide whether it is more correct to accept the boundary figures at 1.138 and 1.147. The older statements of the specific gravity as 1.15 and 1.16 are too high; it is a question whether the balsam which in former times was met with in commerce was perhaps heavier.

2. Ten drops of balsam produce with .4 gram of slaked lime a mixture which remains soft, and does not harden.

3. When shaken with three times its weight of carbon bisulphide the balsam is separated into a dark brown resin, which attaches itself firmly to the glass, and cinnamein, which imparts but little color to the carbon bisulphide.

The lime test, mentioned under 2, is not effectual when castor oil (or other fatty oil) is present. On warming such a mixture of lime, however, the fatty odor is plainly perceptible, if not a very small amount of fat is added, and upon ignition decomposition products of the castor oil are formed, which possess a very peculiar odor.

ADULTERATED IPECACUANHA.

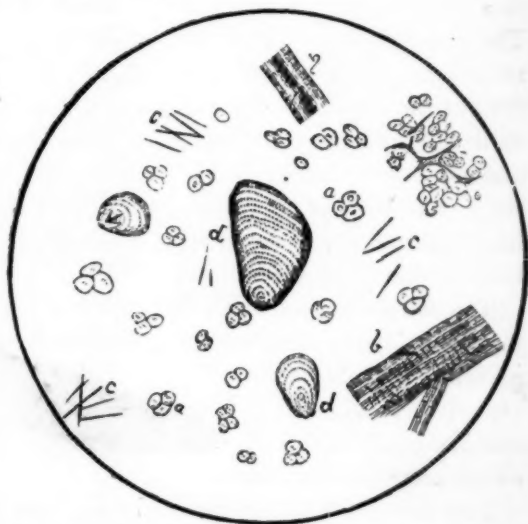
BY LOUISA REED STOWELL

The following substances are reported as having been found in powdered ipecacuanha: Almond meal, licorice, corn meal and potato starch.

The presence of almond meal can be detected by the development of hydrocyanic acid upon infusion in water. The presence of the seed coats as well as the central part of the almond may be detected by the microscope. The central part or the cotyledons are composed of thin-walled hexagonal cells, smaller than the cells of the bark of the ipecac, and loaded with oil drops. They are entirely free from starch grains. Minute spiral vessels are frequently scattered through these cells. The outer seed coat or the dark brown scurfy part of the almond is made up of large oblong cells, with peculiar pits or dots covering the cell-wall. They are about $\frac{1}{50}$ of an inch broad and nearly twice as long. By the way, if some of these cells are scraped

off from the outer surface of the almond and boiled in solution of caustic soda they will make beautiful objects for examination with polarized light under the microscope. Almond meal is probably not of very common use for mixing with ipecac.

A prominent druggist in one of our western cities told me he had found quite a large per cent. of the powdered ipecac, that was sent to him from the east, to be mixed with powdered licorice. The only way to become acquainted with the appearance of licorice under the microscope is to prepare and examine some of the root in the same way we prepared and examined ipecac root, and then to study some of



Powdered ipecac. *a*, starch grains of ipecac. *b*, woody fibre. *c*, crystals. Adulterated with *d*, potato starch.

the powdered licorice. This would hardly be necessary for the identification of licorice when it can so easily be detected by its taste and odor.

By far the most common substance used is potato starch. Of all the specimens of powdered ipecac which I have examined every one had more or less potato starch mixed with it. Only two had corn meal. Potato starch grains are so very characteristic that it would be impossible for any one to mistake them under the microscope for the starch grains of ipecac. They are large, oval, or irregularly ovate grains. Each one possesses a nucleus or spot around which are seen numerous rings. Frequently these are as large as $\frac{1}{100}$ of an inch in length. A very simple way for obtaining some of these starch grains for study is to cut into a potato, and the fine white powder adhering to the knife will be the starch, or if a thin slice of the potato be shaved off and placed in a little water in a watch crystal the fine white sediment found at the bottom will be the starch. The annexed cut illustrates some powdered ipecac adulterated with potato starch.—*The Microscope*, April, 1881.

GLEANINGS IN MATERIA MEDICA.

BY THE EDITOR.

Curare of French Guiana.—Mr. Crévaux states that the following plants enter into the preparation of the curare of the Upper Parou. The principal one is called *ourari*, and is a new species of *Strychnos*, named by Planchon *St. Crevauxii*. The Indians soak the roots, remove the bark with a cutting instrument, and express the juice with their hands. The juice, added to some other unimportant substances (among others a capsicum), is very slightly heated and dried in the sun. The juice of the roots is very bitter and stains the hands brown like tincture of iodine; it may be handled with impunity, provided there are no excoriations.

The accessory plants used in preparing this curare all belong to the piperacæ, namely, 1, *alimiéré*, an undetermined piper; 2, branches agreeing tolerably well with specimens of *Piper lætum*, C. D. C., s. *Ottonia læta*, Kunth; 3, *potpeu*, which approximates to *Piper Hostmannianum*, C. D. C., s. *Artanthe ramiflora*, Miq.; and 4, *aracoupani*, an undetermined piperacea.

The juice of *Hura crepitans*, Lin., which Mr. Crévaux collected on the banks of the Amazon, near to the mouth of the Parou, is used to poison arrows; the species bears the name of *ouassacou*.—*Phar. Jour. and Trans.*, Feb. 19, 1881, p. 693.

Curare of British Guiana.—The principal species used for the preparation of this curare is *Strychnos toxifera*, Benth., the *urari* of the natives; also *arimaru*, which is *Str. cogens*, Schomb., and *yakki*, the *Str. Schomburgkii*, Klotzsch, s. *Str. pedunculata*, Benth., s. *Rouhamon pedunculatum*, A. D. C. The juices of five other plants, known as *volkarimo*, *tarireng*, *tararemer*, *mamica* and *maramu*, are used to thicken the curare.—*Ibid.*, March 12, p. 754.

New African Arrow Poison.—Rob. W. Felkin has sent to Dr. Ringer an arrow poison, which is used on the east coast of Africa, between Zanzibar and the Sourali Land, and is made by the Wanika and Wakamba tribes, who live to the west of an island called Mom-basa. Extracts are made from eleven different roots; the poison is a black extract, of firm consistence, and almost odorless. A. W. Gerard believes that the chief ingredient of the new poison is a *Strophanthus*, either *S. hispidus* or *S. Kombé*, nat. ord. Apocynacæ, thus closely allied to the genus *Strychnos*. Dr. F. R. Fraser, in 1872,

investigated the seeds of an African strophanthus, and found it to be a powerful paralyzing agent and cardiac poison.

The new poison which, in the absence of a name, is called *wanika*, after one of the tribes using it, was found by Gerrard not to contain an alkaloid; it contains a tannin, precipitating ferric salts bluish-green, and a glucoside, which was prepared by diluting the alcoholic extract with water, filtering, precipitating with basic lead acetate, filtering, removing excess of lead by sulphuric acid, evaporating, treating repeatedly with a mixture of chloroform and alcohol to remove glucose, and evaporating. The principle is neutral, amorphous, pungently bitter, soluble in alcohol and water, insoluble in ether and chloroform, yields with strong sulphuric acid a slight brown color, and when heated with soda lime evolves ammonia; with Fehling's solution it gives no reduction till boiled with a dilute acid.

Dr. Ringer found this arrow poison to be a powerful muscle poison, as active as veratria, and, unlike veratria, not prolonging the relaxation of a muscle after its contraction. It is a feeble poison to motor nerves, and has no effect on afferent nerves. It is as powerful a cardiac poison as digitalin, and more so than veratria. It arrests the ventricle in systole, and does not prolong the systole of the heart nearly so much as veratria. It has but little action when administered by the mouth; 5 minims of a 5 per cent. solution hypodermically given will kill a cat in from 15 to 20 minutes, whilst 45 minims given by the stomach caused only nausea and vomiting, with a little weakness.

The antidote to this poison is made in Africa from five roots, which are said to be baked and afterwards ground and mixed with honey; unless given within 5 minutes of the time when the wound is received, the antidote does no good. In the hands of Dr. Ringer it proved to be worthless, whether given internally or applied topically.—*Ibid.*, April 9, pp. 833-835.

Preparation of Cocaina.—V. Truphème exhausts coca leaves by ether in Payen's percolator, arranged for continuous distillation, when a blackish-green liquid is obtained, which is evaporated to dryness. The residue is agitated with boiling water, which dissolves the alkaloid, leaving the impure wax behind. The solution is mixed with magnesia, evaporated to dryness, and the residue treated with amylic alcohol, from which slightly yellowish crystals are deposited, and these are obtained colorless by one recrystallization.—*Jour. de Phar. et de Chim.*, April, 1881, p. 329.

Glucoside from Ivy Leaves.—The leaves of *Hedera helix* contain, according to Vendamme and Chevalier (1842), an alkaloid, *hederina*, and, according to Posselt (1849), a peculiar acid, *hederic acid*, and a tannin, *hederotannic acid*. F. A. Hardten (1875) obtained results indicating the probable presence of a glucoside. According to L. Vernet, the glucoside may be isolated by exhausting the bruised leaves (collected in December) with hot water, and subsequently preparing an alcoholic extract, which is powdered, washed with cold benzol, and afterwards treated with boiling acetone, from which the glucoside crystallized on cooling, requiring washing with cold acetone and crystallization from alcohol to obtain it pure. It crystallizes in nodules of colorless, silky needles, neutral to test paper, melts at 233°C., and burns without leaving any residue. It is insoluble in water, chloroform and petroleum, dissolves very slightly in the cold, but readily by the aid of heat, in acetone, benzol and ether; its best solvent is hot 90 per cent. alcohol; hot alkalies dissolve it readily. Its alcoholic solution is levogyre -47.5° . Its composition is $C_{32}H_{54}O_{11}$. When heated with dilute sulphuric acid it yields a very sweet right rotating sugar, which reduces Fehling's solution, but does not ferment with yeast; and fine, inodorous and tasteless needles, $C_{26}H_{44}O_6$, which melt near 280°C., are less soluble in alcohol than the original compound, insoluble in alkalies and have a right rotation to polarized light.—*Rép. de Phar.*, March, 1881, p. 106, 107.

Cork Tar.—According to L. Bordet, the liquid products of the dry distillation of cork separate into two layers, the lighter aqueous one containing acetic acid and methylic alcohol, together with ammonia, hydrocyanic acid, the higher homologues of acetic acid, including propionic acid and small quantities of methylamina. The heavier tar is dark brown, rather thin and of a more aromatic odor than coal tar. By distillation it yielded 27 per cent. of light oils, 27 per cent. of heavy brown oils, 11 per cent. of green fluorescing oils and 35 per cent. of hard pitch. The less volatile portions of the light oils yield much naphthalin. The tar contains at least 4 per cent. of benzol and 3 per cent. of toluol, but a much smaller quantity of phenols than coal tar. The green fluorescing oil contains considerable anthracene.—*Chem. Ztg.*, 1881, No. 16, p. 269; *Compt. Rend.*, 92, p. 728.

Senega Root.—H. W. Langbeck noticed the odor of gaultheria in a senega root which was at least three years old. Its aqueous distillate acquired with ferric chloride the well-known violet color, and by

comparing the intensity of this reaction with that produced by an aqueous solution of oil of gaultheria, the presence of 0.225 per cent. of this oil in the senega root was estimated.—*Phar. Ztg.*, No. 35, p. 260.

Bulgarian Opium.—In the district of Lowtscha, Bulgaria, opium of a strong odor and bitter taste is produced, which, according to A. Theegarten, yields 11.2 per cent. of impure or 3 per cent. of pure morphia. Nearly 70 per cent. of this opium is soluble in water.—*Ibid.*; *Ph. Zeitschr. f. Russl.*

Adulterated catechu has been observed by A. Jossart. It was of a rather pale brown color, and when finely powdered and completely exhausted with alcohol, 10 grams left a residue weighing 6.5 grams, which, with the exception of small fragments of wood and bark, dissolved in hydrochloric acid, with abundant disengagement of carbonic acid gas; this solution contained mainly iron. From 60 to 65 per cent. of this catechu consisted of ferrous carbonate.—*Jour. Pharm. d'Anvers*, February, p. 41.

Testing of Bees' Wax for Adulterations.—F. Jean recommends testing for water by kneading the wax with well-dried copper sulphate or cobalt nitrate, when with the former salt a blue, and with the latter a rose color will be produced. The quantity of water is determined by heating 10 grams of the wax in a tared porcelain capsule to 100°C., until vapors cease to be given off. *Mineral* and *starchy admixtures* remain behind on dissolving the wax in rectified oil of turpentine; starch is detected in the residue by iodine; and on incinerating the insoluble portion, the loss of weight indicates the organic adulterations. The presence of *sulphur* is indicated by igniting the wax, when sulphurous acid will be generated. *Resin* imparts to wax a terebinthinate odor, and on mastication causes the adulterated wax to adhere firmly to the teeth. On adding to such wax, while fused, a few drops of sulphuric acid, the resin causes a dark red, or if present to the extent of only 1 per cent., a greenish color. On treatment with ether and evaporation of the solvent, the resin is left as a brittle mass, when cold.

If adulterated with *paraffin*, wax is brittle, kneaded with difficulty and has a lower congealing point. By heating with strong sulphuric acid the wax is carbonized and paraffin separated; soft paraffins, however, are not detected in this manner. If wax floats on alcohol of 15°B., = .961 sp. gr., adulteration with paraffin may be surmised. *Vegetable wax* is detected by boiling 10 grams of the wax with 120

grams of water and 1 gram of soda; a slowly separating soap will be formed, while the wax floats in the liquid. The presence of *lard* is indicated by the odor, the fatty touch and the acrolein odor on heating to charring. 10 grams of the wax are saponified by potash lye, the soap is decomposed by sulphuric acid, the clear supernatant layer is washed with hot water, treated with litharge and afterwards digested with ether. On treating the clear ethereal filtrate with sulphuretted hydrogen a black precipitate will be produced, and after complete decomposition and evaporation the residue will make a greasy stain on paper. For the detection of *stearin* one part of the wax is fused with 2 parts of a fixed oil, this mixed with an equal weight of water, and a few drops of lead acetate added, when white, very consistent flocks of lead stearate are separated.—*Chem. Ztg.*, 1881, p. 303, 304.

Factitious saffron, which has been sold to the confectioners and restaurants of Gand, is stated by Crispo to consist of

Water,	16.70
Extractive matter, containing glucose and coloring matter of saffron,	21.02
Vegetable filaments of unknown origin,	12.98
Mineral substances (barytine),	49.30

A little tincture of saffron is mixed with barytine, and the mixture attached, by means of a saccharine material, to the fibres, which are from 3 to 4 centimeters long.—*Jour. Phar. d'Anvers*, Feb., p. 68.

C. Kanoldt has examined a factitious saffron which was of a fine red-brown color and strong odor, and thrown into water colored it milky-yellow. It was found to consist of colorless threads, somewhat divided at the ends, which proved to be an alga, probably *fucus amy-laceus*, which had been incorporated with a colored mixture of chalk and honey.—*Phar. Ztg.*, No. 34, p. 253.

PRACTICAL NOTES.

BY ROBERT F. FAIRTHORNE, PH.G.

Hydro-alcoholic Tinctures.—Practically, I have found that many of these can be prepared so as to make very satisfactory preparations, by macerating the medicinal ingredients for 24 hours in the alcohol alone, then filtering off and mixing with the required or an equal quantity of water and displacing with this mixture. My reason for preferring this method is that the alcohol more thoroughly exhausts the active or flavoring ingredient when alone than it would if mixed with water.

Some may say that the result is the same, but I think if any one will try it they will find an advantage in separate treatment of the drug, especially in such as the compound tincture of cardamom, tincture of serpentaria and tincture of cubebs, the active ingredients of which are more soluble in alcohol than in water. In preparing such tinctures, after the alcoholic solution is filtered off, after maceration during 24 hours, and mixed with water, precipitation occurs. I contend, however, that when this takes place more of the aromatic or active principle is retained in the mixture than would be the case if the same ingredients are treated with the dilute alcohol in the ordinary way. This is on account of the freer solubility of these substances in strong alcohol in the first place, and on account of the extremely fine division of the essential oils, or active ingredients, when precipitated by the addition of water, favoring greater solubility, on the same principle that the extremely fine division of camphor or other essential oils by means of magnesium carbonate renders them more soluble in water. The last-named fact appears to be generally accepted, and I think, upon reflection, the former will be also. It leaves, moreover, the article thus treated in a condition better suited for the extraction of any substance soluble in water or in the mixture of the water and alcohol, and I think a trial of this method will convince any one making it of the advantages to be derived from it.

Mending Broken Glassware.—When glass funnels are cracked or broken, an easy and expeditious way to mend them will be found by first warming the article broken over a stove, and applying strips of sheet gutta percha (about an inch wide) over the crack, and of such a length that they will cover the entire length of the split. After one piece is attached to the glass another is placed on this, and even a third or fourth layer is so disposed, in order to form a firm support to the broken pieces of glass, so as to present a proper continuity of surface, thereby restoring it to its original form. The glass should not be heated too much, but only to a degree sufficient to render the gutta percha applied to it adhesive. This sticks very tenaciously to the glass. I have mended funnels by this plan that have been broken in four or five pieces, and have found them quite as useful as the unbroken ones.

The ease with which articles can be thus mended, and the strength given them by being thus supported by so strong a substance, will doubtless commend its use to many who, like myself, make much use of glassware.

Oriental Collyria.—Gayda and Georges report that under the name of *k'heul* the Arabs employ circular cakes, about .015 meter in diameter, less than 2 mm. thick, and weighing about 1.4 gram each. The white cakes are soluble in distilled water, and consist of potassium nitrate with from 5 to 8 per cent. of impurities, consisting of salts of alkalies, calcium and iron. The greenish-blue cakes are not completely soluble, and consist of potassium nitrate, to which from 5 to 10 per cent. of copper sulphate has been added. These cakes are evidently made by fusion and pouring the melted salts into moulds.—*Jour. de Phar. et de Chim.*, April, 1881, 329—331.

Estimation of Phosphoric Acid.—According to Alb. Atterberg, phosphoric acid is at once completely precipitated by ammonium molybdate, if the mixture is heated to boiling, and the analytical results are not altered either by washing the precipitated ammonium phosphomolybdate, as proposed by Eggert, with 1 per cent. nitric acid or with dilute molybdic acid (1:3), or, as suggested by Finkener, with a 20 per cent. solution of ammonium nitrate.—*Chem. Ztg.*, 1881, p. 303.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, May 17, 1881.

In the absence of the President, Mr. Alonzo Robbins was called to the chair. The minutes of the last pharmaceutical meeting were read and approved.

Professor Maisch presented three specimens of argentiferous and auriferous ores from Mr. L. I. Morris of the last graduating class.

Professor Sadtler presented a copy of "Experiments and Observations on Electricity, Made at Philadelphia in America, by Mr. Benjamin Franklin, and Communicated in Several Letters to Mr. P. Collinson," published at London in 1751 and 1753. The letter numbered 10 describes Franklin's famous kite experiment. On motion, the work was accepted with thanks.

Mr. McIntyre presented a specimen of the oil of the seeds of the palm nut, made by the M. S. Shoemaker Company, limited, by the benzin process; the odor of the benzin is so marked that it would render the oil valueless for any delicate purpose; there is no commercial use at present for the oil.

Professor Maisch alluded to the death of Dr. Wilson H. Pile, who has been identified with this College for a long term of years; this notice was thought especially appropriate at a pharmaceutical meeting, as he had acted for some time as Registrar and in various other capacities, and since it was partly through his efforts that these meetings were reorganized (in 1870) and their interest greatly extended. His kindness of heart, the high esteem in which he was held in his various relations of life, his patient and exact

observations and his readiness of communicating knowledge from his extensive and varied experience, were commented on by several of those present.

Mr. Boring made some remarks in relation to *fluid extract of guarana*, as made by himself with a menstruum of alcohol, glycerin and water. When first prepared it was brilliantly transparent and free from deposit, but after a time a sediment was observed which, when loosened, was soluble in a menstruum rendered alkaline with ammonia.

Mr. Robbins stated that a menstruum free from glycerin, made of equal weights of alcohol and water, was better and that no deposit occurred when it was used.

Mr. W. B. Thompson urged, and the members present coincided with him, that a much larger number of the members of the College should attend these meetings and bring forward whatever subjects interested them personally; this would tend greatly to enhance the interest and usefulness of these meetings.

Dr. L. Wolff made some remarks in regard to the antiseptic powers of *salicylic acid* and other substances. His experience was that *salicylic acid* was, at least in some cases, better than phenol. Many of the substances experimented with proved to be valueless for this purpose.

A member queried as to the cause of the appearance of a violet color in *iodide of potassium*. It was the general opinion that it was due to decomposition of the salt, a small quantity of free iodine only being required to discolor a great deal of the salt.

Dr. Wolff suggested that a correct and ready method of determining the *value of pepsin* would be an excellent subject for some member to report on next fall.

There being no further business, the meeting adjourned until the third Tuesday of October.

T. S. WIEGAND, Registrar.

*PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

PHILADELPHIA COLLEGE OF PHARMACY.—A year ago this College forwarded to Melbourne, Australia, a collection of indigenous American drugs for the exhibition which has been held there during the past months. The collection, which was similar to the one forwarded to the last Paris exposition, attracted considerable attention, and has been honored with an award of the first degree; it has been presented to the Pharmaceutical Society of Victoria.

TRADE ASSOCIATION OF PHILADELPHIA DRUGGISTS.—The annual meeting was held April 11th, President C. H. Needles in the chair. The minutes of the semi-annual meeting were read and approved. The Secretary of the Executive Committee read the minutes of that body since the last meeting of the Association. Twenty-three new members were elected. The address of the President reviewing the work of the year was read, and

a number of suggestions tending, in his judgment, to strengthen the Association and increase its usefulness were made. The Treasurer's report was read, and referred to a committee of audit, who reported it correct.

The following gentlemen were elected officers for the ensuing year: C. H. Needles, President; Dr. L. Wolff, Vice President; T. S. Wiegand, Secretary; Chas. W. Hancock, Treasurer.

The subject of life membership was discussed, it being thought that it might improve the finances of the Association.

Prof. Remington alluded to the circular of the Medico-Legal Society and the connection of Messrs. Parke, Davis & Co. with it, as well as the letter from this firm, repudiating Dr. Stewart's action in the matter so far as they were concerned.

The obnoxious action of the County Medical Society was commented on with some severity, after they had expressed themselves satisfied with a firm adherence to the codes of ethics which their own Society and the Philadelphia College of Pharmacy have long since adopted. It was in view of this action that the following resolution was passed: "That it is the sense of this Association that both the physician and apothecary are the servants of the public, and that in their relations to the public they are upon a basis of equality."

Mr. Fox advocated the adoption of a uniform scale of prices.

Mr. England offered a resolution adjourning three months at the call of the chairman, with the view of considering a change in the by-laws, so as to have quarterly meetings, and also to discuss the proposal for regulating the prices of prescriptions.

Mr. Turner asked attention to the patent medicine tax, and, on motion of Prof. Remington, it was determined to refer the subject to the Executive Committee, who might have the advice of counsel in the matter.

After passing the necessary bills, the meeting adjourned.

NATIONAL COLLEGE OF PHARMACY.—The retirement of Prof. O. Oldberg from the office of Medical Purveyor of the Marine Hospital Service, and his removal from Washington, necessitated a recasting of the Faculty of the College, which resulted in the following choice: Prof. E. T. Fristoe for the chair of General Chemistry, Prof. H. B. Parsons for the chair of *Materia Medica* and Botany, Prof. H. E. Kalusowski for the chair of Pharmacy, Prof. A. M. Read for the chair of Analytical Chemistry.

The officers of the College are: President, W. G. Duckett; Vice Presidents, J. R. Major and R. A. Bacon; Secretary, Chas. Becker; Treasurer, John A. Milburn. Additional Trustees—Messrs. Ferguson, Thompson, Kullberg, Dowling, Simms, O'Donnell and Read.

The annual commencement had to be deferred until June, as the course in analytical chemistry does not close until the last of May.

ST. LOUIS COLLEGE OF PHARMACY.—At the meeting of the Board of Trustees, held May 17th, the various standing committees were appointed, and the Committee on Prospectus was instructed to consider the necessity of advancing the fees for the coming scholastic year; also, to ascertain

whether it would be advisable to change lecture time from night to day-time. The Faculty consists of Otto A. Wall, M.D., Ph.G., Professor of Materia Medica; Chas. A. Curtman, M.D., Professor of Chemistry, and James M. Good, Ph.G., Professor of Pharmacy.

NEW YORK STATE PHARMACEUTICAL ASSOCIATION.—The annual meeting was held at Buffalo May 18 and 19, the attendance being large; 129 new members were elected. The exhibition was fine. On the evening of the 18th a reception was held at St. James Hall, and on the 19th an excursion to Niagara. No further information has been received from the officers.

NEW JERSEY PHARMACEUTICAL ASSOCIATION.—The eleventh annual meeting was held in Trenton on the 18th and 19th of May. After the annual address by the President, Wm. R. Laird, of Jersey City, the following officers were elected for the ensuing year: President, Chas. Holzhauser, Newark; Vice Presidents, G. A. Mangold, Trenton, E. S. Reed, Atlantic City; Treasurer, Wm. Rust, New Brunswick; Recording Secretary, A. P. Brown, Camden; Corresponding Secretary, R. W. Vandervoord, Newark. Standing Committee—G. A. Mangold, Trenton; E. P. Nichols, Newark; Mulford Ludlam, Millville; A. G. Smith, Belvidere; J. C. DeCou, Trenton. Reports were received from the Board of Pharmacy and from delegates to the various pharmaceutical associations. The Treasurer's report showed that the financial condition of the society was good. Papers were read by Dr. E. P. Nichols, G. A. Mangold, D. W. Brant and A. P. Brown.

In the afternoon the ladies were conveyed in carriages to the various places of interest in and around Trenton, and in the evening the members and their ladies sat down to a splendid banquet at the State Street House, furnished by the pharmacists of Trenton.

Thursday morning session was devoted to the appointment of committees, and in the afternoon the members and lady friends were conveyed to the New Jersey Pottery, where they viewed the different styles of wares as well as the process of manufacturing and decoration. Before leaving, Mr. Henry T. Cook, President of the Pottery Company, presented each one with a handsome decorated mug as a memento of the visit.

Committees were appointed to draft resolutions relative to the death of William King, of Jersey City, and William Neergard, honorary member from New York.

On motion, it was decided to hold the next meeting at Atlantic City.

OHIO STATE PHARMACEUTICAL ASSOCIATION.—The third annual meeting was held at Toledo, May 18 and 19, the President, J. W. Dietrich, in the chair. The reports of the different officers and committees were presented and considered. In one of the reports it was urged that a table of maximum doses be introduced into the Pharmacopœia, comprising all medicines of a strong or poisonous character, with the view of requiring physicians prescribing larger doses to signify the correctness of their intention by affixing an asterisk (*) or cross (+). The following officers were

elected for the ensuing year: President, J. N. Reed, Toledo; Vice-presidents, T. L. A. Greve, Cincinnati and F. O. McCoy, Kenton; Secretary Lewis C. Hopp, Cleveland; Treasurer, Charles Huston, Columbus. The next annual meeting will be held at Zanesville, of which place Dr. Peters was elected Local Secretary. An excursion by steamer on the river and Lake Erie was had after adjournment.

MISSOURI STATE PHARMACEUTICAL ASSOCIATION.—At a call meeting, convening at Sedalia May 5th, nine druggists, representing the different portions of the State, were recommended to the Governor from which to select three, which latter number will constitute the Board of Pharmacy for the State of Missouri. The nine are: M. W. Alexander, Ph.G., St. Louis; R. S. Miller, M.D., Sedalia; W. S. Ford, Kansas City; M. A. Brown, M.D., Miami; H. C. Churchill, Windsor; H. C. Brown, M.D., Moberly; W. A. Hall, M.D., Springfield; A. H. Coffee, Carthage; J. F. Hurt, Ph.G., Columbia. Delegates were also appointed to attend the meeting of the American Pharmaceutical Association at Kansas City in August next.

PHARMACY IN WEST VIRGINIA.—Under the pharmacy act recently passed in this State, the Board of Public Works, on May 18th, appointed the following three Commissioners of Pharmacy: Edmund Bocking, Wheeling; J. W. L. Baker, Martinsburg, and Ed. L. Boggs, Charleston.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.—The pharmaceutical meeting, held Feb. 2d, was occupied by the reading and discussion of a paper, by Professor Redwood, on "the *weights, balances and measures* employed in pharmacy, their defects and the remedy." Among the many interesting points discussed were the limits of deviation of weights from the legal standards which were given, as being in the direction of excess, for $\frac{1}{2}$ grain = 0.02 gr., for gr. i to \mathfrak{Dss} = 0.05 gr., for \mathfrak{Di} to \mathfrak{ziv} = 0.10 gr. and for \mathfrak{zi} to \mathfrak{zx} = 0.25 gr. The different shapes of measures were discussed, notably those used for minims, and the advantages and disadvantages of the conical and cylindrical measures, the minim pipette and syringe pipette pointed out. Prof. Redwood insisted that all graduations should be made according to a uniform plan, and suggested for this purpose the bottom of the meniscus, since that was the only part which could be clearly defined.

At the meeting of March 2d Mr. Holmes read a paper on *Jafferabad aloes* (see April number, p. 174), and Mr. Baker, of Kew, gave an interesting account of the botany of the genus *Aloe* and allied genera, which was further continued by Prof. Bentley and Mr. Holmes.

A paper by Mr. T. E. Greenish on *artificially colored rose leaves* was read. The petals were found to be colored by rosanilin, which imparted to the tincture made with proof spirit a deep crimson color. Two ounces of the tincture were made alkaline by ammonia, a few threads of fine white wool were added, and the whole boiled until the spirit and ammonia were

dissipated. The wool was washed, heated gently with a 10 per cent. solution of potassa, the solution cooled and diluted with half its volume of alcohol. This mixture was well shaken with half its volume of ether; the ethereal solution, after separation and on the addition of acetic acid, produced at once the pink color of acetate of rosanilin, which was instantly discharged by nascent hydrogen. In the discussion following it was stated that these petals appeared to be those of *Rosa centifolia*, not previously exhausted, but probably discolored; they were of German origin, shipped from Hamburg to many wholesale druggists in London. Mr. Child had examined another sample of dyed rose leaves, and found the color to differ from rosanilin and to resemble colein; the ethereal tincture was of a slight pink, the alcoholic tincture of a much deeper color; with sulphuric acid these solutions were scarcely heightened in color, but on neutralizing with potassa they became distinctly yellow, and on again adding sulphuric acid a color resembling that of potassium bichromate was produced. The tincture of true rose leaves has the color materially developed on the addition of sulphuric acid, changed to greenish-yellow by potassa, and the pink color restored by sulphuric acid. Ether had no action on the rose leaves in Mr. Greenish's possession, and caustic alkali, instead of producing the usual green color, produced a deep brown and afterwards decolorized.

A sample of *oil of aloes*, prepared by Messrs. T. & H. Smith, of Edinburgh, was shown; 500 pounds of aloes yielded only 2 drachms of the oil.

At the meeting held April 6th Mr. A. W. Gerrard read a paper on *wanika*, a new African arrow poison (see abstract on page 304). Professor Bentley called attention to the fact that there was very little information as to the plant from which it had been derived; also, that there was no very close alliance between *Strophanthus* and *Strychnos*, although they belonged to neighboring orders, both of which contained many poisonous plants. Mr. Holmes, however, held that the *Loganiaceæ* and *Apocynaceæ* were not very widely separated in properties; he showed the ordeal poison of Madagascar obtained from *Tanghinia venenifera* and alluded to the powerful poison obtained in Jamaica from *Urechites suberecta*, also an apocynaceous plant, which he believed had a similar paralyzing effect. The South American species of *Strychnos* and *Gelsemium sempervirens* both appeared to possess a somewhat similar action to the *Strophanthus*.

Professor Redwood exhibited a *pharmaceutical balance*, which as then adjusted was sensible to the $\frac{1}{100}$ grain, but by a simple arrangement the centre of gravity could be altered so as to make it sensible to the $\frac{1}{30}$ grain, and by an alteration of the bearings to the $\frac{1}{20}$ grain. A discussion was had on the necessity of having reliable dispensing balances, of a moderate price and accurate weight.

Mr. Holmes called attention to a number of specimens received for the museum, among which was a species of mint resembling *Mentha sylvestris*, which is cultivated at Bombay for yielding oil of peppermint; the oil of *Nardostachys Jataimansi* which has an odor somewhat resembling valerian and tea combined; *Naregamia alata*, a drug used by the Portuguese at Goa, in doses of 12 to 20 grains, as an emetic, and not possessing the property of producing tightness of breath and other disagreeable symptoms

induced in some persons by ipecacuanha; also the bark of *Wrightia antidysenterica* or kurchi bark, and the alkaloid *kurchicina*, rediscovered by Baboo Ram Chundra Dutta, second assistant to the Professor of Chemistry at the Calcutta Medical College.

EDITORIAL DEPARTMENT.

INTERNATIONAL PHARMECEUTICAL CONGRESS.—The following circular letter, which explains itself, has been received:

17 BLOOMSBURY SQUARE, LONDON, W. C., April, 1881.

DEAR SIR—The Executive Committee appointed by the Council of the Pharmaceutical Society of Great Britain to make arrangements for the business of this meeting desires me to inform you that the following is the programme provisionally contemplated.

On Saturday evening, July 30th, the President of the Pharmaceutical Society will hold a conversazione at 17 Bloomsbury Square, London, for the reception of visitors.

The business meetings of the Congress will be held at the house of the Pharmaceutical Society on Monday, Tuesday and Wednesday, the 1st, 2d and 3d of August. The chair will be taken each day at eleven o'clock, and at one o'clock there will be an adjournment of one hour for luncheon.

The business of the Congress will be conducted, as far as possible, in English, but provision will be made for translating communications in other languages.

The subjects at present suggested for discussion may be referred to one or other of the following heads:

1. Equalization of the Strength of Official Pharmaceutical Preparations Containing Potent Drugs.
2. Pharmaceutical Education.
3. Pharmacopœia Revision.

Should you intend taking part in the discussion on any of these subjects, I am instructed to request that, for the purpose of facilitating the proceedings of the Congress, you will favor me with a statement of your views in writing, as early as convenient, and *not later than July 1st*. The Executive Committee will also be glad to receive papers to be read at the meetings, as opportunity may admit. All such communications will be submitted to a committee, which will prepare condensed reports in English, French and German on the subjects to be brought before the Congress.

The first presentation of the Hanbury Gold Medal, to be awarded biennially "For high excellence in the prosecution or promotion of original research in the natural history and chemistry of drugs," and in memory of the late Daniel Hanbury, F.R.S., will be made at this meeting of the Congress.

On Tuesday, August 2d, the British members will entertain their foreign guests at a banquet, and on Thursday, August 4th, an excursion or excursions will be organized to some place or places in the neighborhood of London. Other entertainments will be provided, of which due notice will be given.

An early reply is especially requested.

I am, dear sir, yours faithfully,

RICHARD BREMRIDGE,
Secretary to the Executive Committee.

It will be observed that the date fixed for the convening of the Congress, being the first week of August, would make it possible for American delegates to attend and return in time for participating also in the deliberations of the American Pharmaceutical Association, the meeting of which

body, at Kansas City, will not take place until August 23d. We sincerely hope that several representative pharmacists of the United States may find it convenient to attend the International Pharmaceutical Congress.

SAXOLIN.—In the article headed "Petrolatum," on page 256 of our May number, we unwittingly made a mistake in relation to the name saxolin. In the report of the sub-committee of the Committee of Revision it was stated that "the name saxolinum has already been appropriated by Mr. Stearns, but he offers and surrenders it to our committee." Mr. Stearns informs us that the name had been adopted by him months before he heard of its being proposed for the Pharmacopœia, and that it was neither appropriated by him nor copyrighted.

SYRUPUS IPECACUANHÆ.—In the formula on page 246 the amount of acetic acid should be f 3i.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

A Treatise on the Continued Fevers. By James C. Wilson, M.D., Physician to the Philadelphia Hospital and to the Hospital of the Jefferson Medical College. With an introduction by Professor J. M. DaCosta, M.D. New York: William Wood & Co. 8vo, pp. 365.

This is one of the series published as Wood's Library of Standard Medical Authors, several of which we have noticed in our last issue. The volume now before us treats of the group of continued fevers, namely, simple continued fever, influenza, cerebro-spinal fever, enteric or typhoid fever, typhus fever, relapsing fever and dengue. The book gives abundant evidence of close observation and of extensive research, and the publishers present it in a very attractive form.

Die Naturgeschichte des Cajus Plinius Secundus. Ins Deutsche übersetzt und mit Anmerkungen versehen von Prof. Dr. G. C. Wittstein. Leipzig: Gressner & Schramm. Price per part, 2 marks.

The Natural History of Cajus Plinius Secundus. Translated into German, with the addition of notes, by Prof. Dr. G. C. Wittstein.

Parts 2, 4 and 5 of this work are now before us. The appearance of the first part was noticed and commented upon on page 588 of our last volume. Those conversant with the German language will find the various notes, critical, historical, geographical, etc., a very acceptable addition to the excellent translation of this ancient work, the eleventh book of which commences in the fifth part.

Proceedings of the California Pharmaceutical Society and College of Pharmacy, and report of the twelfth annual meeting, held at San Francisco January 13, 1881.

In the following we give brief abstracts of the papers contained in this pamphlet.

Decolorized Iodine.—Sulphurous acid being used to some extent for decolorizing tincture of iodine, S. A. McDonnell suggests to prepare an aqueous solution of the same iodine strength as the tincture, by triturating iodine ʒss, dissolving it in sulphurous acid ʒiiss, and diluting with water to obtain 1 fluidounce. The liquid is colorless, and contains hydriodic and dithionic acids. A strong solution, in which one-half of the iodine remains in the free state, is obtained by dissolving 200 grains of iodine in 1 ounce of sulphurous acid. It is of a rich dark red color, and can be diluted to any extent with alcohol or glycerin, or both, but not with water, which causes a precipitation of the iodine.

Fluid Magnesia.—P. L. Vreeland shows that the process for solution of carbonate of magnesium, Brit. Ph., is unfeasible for the pharmacist, and incapable of being more simplified, even with an apparatus simple in construction and easily managed. A superior product in every respect is the officinal liquor magnesiæ citratis.

Substitute for Vaseline.—P. L. Vreeland recommends the process for mollisine recommended by Wm. C. Bakes (this journal, 1880, p. 9), but found it necessary to deodorize the spindle oil, which was accomplished by spreading it upon a wide expanse of water, and boiling for some time. One gallon of spindle oil will yield four pounds of the purified product, and with 1 lb. of yellow wax will make the cost 30 cts. per lb.

Liquor Ferri et Ammonii succinatis.—Prof. W. T. Wenzell recommends the following: Dissolve 50 grains of succinic acid in 3 fluidounces of water, neutralize nearly with ammonia, and dilute to 6 fluidounces. Transfer to an 8oz. bottle, add half a fluidounce of the officinal liquor ferri persulphatis, agitate well, and wash the precipitated ferric succinate upon a filter thoroughly with distilled water.

Next take 89 grains of citric acid and add, with stirring, a sufficient quantity of ammonia until the acid is dissolved and the solution neutral. In this solution dissolve the moist ferric succinate with the aid of a gentle heat, and dilute to 6 fluidounces, when each fluidrachm will contain 2 grains of ferric succinate, or 5 grains of the double salt.

Syrupus Scillæ comp.—P. L. Vreeland recommends a modification of the Pharmacopœia process as follows: To 8 oz. of fluid extract, obtained by evaporating the tincture of squill and senega, add 6 oz. of lime water and 4 oz. of distilled water; allow to stand for 12 hours, filter, and in the filtrate dissolve without heat 40 oz. of granulated sugar; lastly, dissolve 48 grains of tartar emetic in ½ oz. distilled water, add to the syrup, and bring the measure up to three pints by adding heavy rock syrup.

Annual Review of the Drug Trade of New York for the year 1880. By Daniel C. Robbins. 1881.

This has been prepared for the twenty-third annual report of the Chamber of Commerce of the State of New York. The total importation of drugs, chemicals, oils, soaps and spices was, in 1880, \$48,073,158, against \$36,008,208 in 1879.

Nostrums in their Relations to the Public Health. By Prof. Albert B. Prescott, M.D., of Ann Arbor.

An excellent essay, demonstrating the evils resulting from the use of secret medicines, and the proper means for combatting these evils. A reprint from the "Physician and Surgeon," May, 1881.

Phenol, or Carbolic Acid; Qualitative or Quantitative Tests. By E. Waller, Ph.D. New York.

After a review of the various methods proposed, the author describes a modification of Landolt's test (this journal, 1872, p. 321, 418) by means of bromine water, the improvement consisting mainly in the addition of a solution of alum in diluted sulphuric acid, by which the bromine precipitate becomes denser and separates readily. Reprinted from the "School of Mines Quarterly."

The following pamphlets have been received:

Dr. E. Jenner's Discovery of Vaccination. By E. L. B. Godfrey, M.D., Camden, N. J.

A Statistical Report of 252 Cases of Inebriety Treated at the Inebriates' Home, Fort Hamilton, L. I. By Lewis D. Mason, M.D.

Eighth Biennial Report of the Illinois Asylum for Feeble-minded Children at Lincoln. Svo, pp. 70.

Trance and Tranceoidal States in the Lower Animals. By George M. Beard, A.M., M.D. New York, 1881.

OBITUARY.

JOHN ABRAHAM, one of the leading pharmacists of Liverpool, died there last February, in the sixty-eighth year of his age. He served, for several years, on the Pharmaceutical Council, and was several times elected President of the Liverpool Chemists' Association and of other pharmaceutical bodies. He was a corresponding member of the Philadelphia College of Pharmacy.

RUDOLPH CHRISTIAN BOETTGER, PH.D., Professor of Chemistry at the Physical Institute in Frankfort-on-the-Main, died there April 29, aged 75 years. He studied at first theology, and afterwards chemistry, and then devoted himself chiefly to applied chemistry. He discovered and published the process for preparing gun cotton, after Schoenbein had discovered it without making the process known. He was the editor of the "Polytechnisches Notizblatt," and the author of numerous, mostly short but important, papers on chemical processes and assays, as applied to the arts.

ALFRED S. LANE died at Rochester, N. Y., March 24. He was born in Norwich, England, January 17, 1822, and came to this country with his parents at the age of 8 years. After clerking in Michigan and New York, he formed the partnership of Lane & Paine at Rochester, but retired from active business some years ago. He was well known to and highly esteemed by the members of the American Pharmaceutical Association, of the annual meetings of which he was a frequent attendant.

JOHN MACKAY died at Edinburgh, his native city, April 19, in the sixty-third year of his age. He has been Honorary Secretary of the North British branch of the Pharmaceutical Society of Great Britain since 1841, declining repeatedly a nomination for the chair, and since 1861 served on the Council. He was the author of numerous papers on pharmaceutical and kindred subjects, many of them being contributed to the pharmaceutical meetings. He was a corresponding member of the Philadelphia College of Pharmacy.

J. PERSONNE, professor of analytical chemistry at the Paris School of Pharmacy, died there several months ago, aged 64 years. Among his numerous researches may be mentioned those on lupulin, compounds of phosphorus, iodine, etc., titration of mercury, chloral, chloroform, etc.

LUDWIG RABENHORST, PH.D., died at Meissen, Germany, in his seventy-fifth year. The deceased was a pharmacist, but for many years devoted himself to botany and was widely known as investigator of the cryptogams.

JOHN STENHOUSE, F.R.S., died December 31, 1880. He was born at Glasgow in 1809 and studied chemistry under Graham and Liebig. In his numerous researches, he investigated a large number of products and principles of medicinal and pharmaceutical importance, such as aloin, many volatile oils, salts of quinidia, strychnia and other alkaloids, various tannins, etc. In recognition of his valuable researches he had been elected honorary member of several pharmaceutical societies.

JULIUS VOGEL, M.D., Professor of Medicine and Director of the Pathological Institute at Halle, Germany, died recently in his sixty-seventh year. The deceased was one of the authors of a very elaborate work on the analysis of urine, his collaborer having been Prof. C. Neubauer.

PROFESSOR ALPHONSO WOOD, the well-known botanist and author of several valuable works on North American botany, died at New York last March in the seventy-first year of his age. For two years he held the chair of botany in the New York College of Pharmacy.